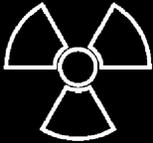
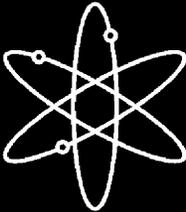




Generic Environmental Impact Statement for License Renewal of Nuclear Plants



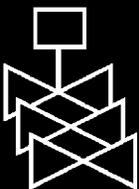
Supplement 28



**Regarding
Oyster Creek Nuclear Generating Station**



Final Report - Appendices



**U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001**



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Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 28

Regarding Oyster Creek Nuclear Generating Station

Final Report - Appendices

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**Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**



Abstract

The U.S. Nuclear Regulatory Commission (NRC) considered the environmental impacts of renewing nuclear power plant operating licenses (OLs) for a 20-year period in its *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, and codified the results in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51). In the GEIS (and its Addendum 1), the NRC staff identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. Additional plant-specific review is required for the remaining 23 issues. These plant-specific reviews are to be included in a supplement to the GEIS.

This Supplemental Environmental Impact Statement (SEIS) has been prepared in response to an application submitted to the NRC by AmerGen Energy Company, LLC (AmerGen), to renew the OL for Oyster Creek Nuclear Generating Station (OCNGS) for an additional 20 years under 10 CFR Part 54. This SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the NRC staff's recommendation regarding the proposed action.

Regarding the 69 issues for which the GEIS reached generic conclusions, neither AmerGen nor the NRC staff has identified information that is both new and significant for any issue that applies to OCNGS. In addition, the NRC staff determined that information provided during the scoping process did not call into question the conclusions in the GEIS. Therefore, the NRC staff concludes that the impacts of renewing the OCNGS OL would not be greater than the impacts identified for these issues in the GEIS. For each of these issues, the NRC staff's conclusion in the GEIS is that the impact would be of SMALL^(a) significance (except for collective offsite radiological impacts from the fuel cycle and high-level waste and spent fuel, which were not assigned a single significance level).

Regarding the remaining 23 issues, those that apply to OCNGS are addressed in this SEIS. For most issues, the NRC staff concludes that the significance of the potential environmental impacts of renewal of the OL would be SMALL. The NRC staff also concludes that no additional mitigation is warranted. The NRC staff determined that information provided during the scoping process did not identify any new issue that has a significant environmental impact. For aquatic resources, the NRC staff determined that the impacts of continued operation of the once-through cooling system during the license renewal term could, for some species, be MODERATE if species composition and abundance of aquatic organisms in Barnegat Bay have

(a) Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

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| changed substantially from the 1970s and 1980s when the last studies of the effects of OCNGS
| operations were conducted. Alternatives to continued operation of the existing once-through
| cooling system that would mitigate impacts on aquatic resources were evaluated.

| The NRC staff's recommendation is that the Commission determine that the adverse
| environmental impacts of license renewal for OCNGS are not so great that preserving the option
| of license renewal for energy-planning decisionmakers would be unreasonable. This
| recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental
| Report submitted by AmerGen; (3) consultation with Federal, State, and local agencies; (4) the
| NRC staff's own independent review; and (5) the NRC staff's consideration of public comments
| received during the scoping process.

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Abbreviations/Acronyms

μCi	microcurie(s)
μg	microgram(s)
μm	micrometer(s)
μSv	microsievert(s)
ac	acre(s)
AC	alternating current
ACC	air-cooled condenser or averted cleanup and decontamination costs
ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act
AEC	U.S. Atomic Energy Commission
ALARA	as low as reasonably achievable
AmerGen	AmerGen Energy Company, LLC
AOC	Area of Concern or averted offsite property damage costs
AOE	averted occupational exposure
AOSC	averted onsite costs
APE	averted public exposure
AQCR	Air Quality Control Region
ASLB	Atomic Safety and Licensing Board
ASME	American Society of Mechanical Engineers
ASMFC	Atlantic States Marine Fisheries Commission
ATSDR	Agency for Toxic Substances and Disease Registry
ATWS	anticipated transient without scram
ATV	all-terrain vehicle
BA	Biological Assessment
BBNEP	Barnegat Bay National Estuary Program
BO	Biological Opinion
BOD	biochemical oxygen demand
Btu	British thermal unit(s)
BWR	boiling-water reactor
BWROG	Boiling-Water Reactor Owners Group
°C	degree(s) Celsius
CAA	Clean Air Act
CAFRA	Coastal Area Facility Review Act
CCC	Caribbean Conservation Corporation
CDF	core damage frequency or combined disposal facility

Abbreviations/Acronyms

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Ci	curie(s)
cm	centimeter(s)
CO	carbon monoxide
CO ₂	carbon dioxide
COE	cost of enhancement
CPC	Center for Plant Conservation
CREST	Continuous Radiological Environmental Surveillance Telemetry
CWA	Clean Water Act
CWPCF	Central Water Pollution Control Facility
CZMA	Coastal Zone Management Act
d	day(s)
DBA	design-basis accident
DC	direct current
DDT	dichloro-diphenyl-trichloroethane
DOC	U.S. Department of Commerce
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DPR	demonstration project reactor
DSM	demand-side management
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	Environmental Impact Statement
ELF-EMF	extremely low frequency-electromagnetic field
EPA	U.S. Environmental Protection Agency
EPACT	Energy Policy Act of 2005
ER	Environmental Report
ESA	Endangered Species Act
ESMP	Environmental Surveillance and Monitoring Program
Exelon	Exelon Corporation
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FACA	Federal Advisory Committee Act
FES	Final Environmental Statement
FPRA	Fire Probabilistic Risk Assessment

Abbreviations/Acronyms

FR	Federal Register
FSAR	Final Safety Analysis Report
ft	foot (feet)
ft ³	cubic foot (feet)
FWS	U.S. Fish and Wildlife Service
g	gram(s)
gal	gallon(s)
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
GL	Generic Letter
GLCF	Global Land Cover Facility
gpd	gallon(s) per day
gpm	gallon(s) per minute
HEPA	high-efficiency particulate air
HLW	high-level waste
hp	horsepower
hr	hour(s)
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inch(es)
INEEL	Idaho National Engineering and Environmental Laboratory
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISRA	Industrial Site Recovery Act
ITS	Incidental Take Statement
J	joule(s)
JCP&L	Jersey Central Power & Light Company
kg	kilogram(s)
kV	kilovolt(s)
kW	kilowatt(s)
kWh	kilowatt hour(s)
L	liter(s)
lb	pound(s)
LERF	large early release frequency
LLTF	Lessons Learned Task Force
LOCA	loss-of-coolant accident

Abbreviations/Acronyms

LOOP	loss of offsite power
m	meter(s)
m ²	square meter(s)
m ³	cubic meter(s)
mA	milliampere(s)
MAAP	Modular Accident Analysis Program
MACCS2	Melcor Accident Consequence Code System 2
MAFMC	Mid-Atlantic Fishery Management Council
MDOC	Maine Department of Conservation
MEI	maximally exposed individual
mg	milligram(s)
mi	mile(s)
mi ²	square mile(s)
min	minute(s)
mL	milliliter(s)
mm	millimeter(s)
MMACR	modified maximum averted cost risk
MMSC	Marine Mammal Stranding Center
mph	mile(s) per hour
mrem	millirem(s)
mSv	millisievert(s)
MT	metric ton(s) (or tonne[s])
MTBE	methyl tertiary-butyl ether
MTU	metric ton(s)-uranium
MW	megawatt(s)
MWd	megawatt-day(s)
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Sciences
NCES	National Center for Educational Statistics
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFSC	Northeast Fisheries Science Center
ng	nanogram(s)
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJDHSS	New Jersey Department of Health and Senior Services

Abbreviations/Acronyms

NJONLM	New Jersey Office of Natural Lands Management
NJPDES	New Jersey Pollutant Discharge Elimination System
NMFS	National Marine Fisheries Service
NO _x	nitrogen oxide(s)
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
OCDP	Ocean County Department of Planning
OCNGS	Oyster Creek Nuclear Generating Station
OCPB	Ocean County Planning Board
ODCM	Offsite Dose Calculation Manual
OL	operating license
ONJSC	Office of New Jersey State Climatologist
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi	picocurie(s)
PL	Public Law
PM _{2.5}	particulate matter, 2.5 microns or less in diameter
PM ₁₀	particulate matter, 10 microns or less in diameter
ppm	part(s) per million
ppt	part(s) per thousand
PRA	Probabilistic Risk Assessment
PSD	Prevention of Significant Deterioration
psig	pound(s) per square inch
RAI	request for additional information
REMP	radiological environmental monitoring program
RG	Regulatory Guide
RI	Remedial Investigation
ROI	region of interest
RPC	replacement power cost
RPHP	Radiation and Public Health Project
rpm	revolution(s) per minute
RRW	risk reduction worth

Abbreviations/Acronyms

s	second(s)
SAMA	severe accident mitigation alternative
SAR	Safety Analysis Report
SAV	submerged aquatic vegetation
SCR	selective catalytic reduction
SECA	Solid State Energy Conservation Alliance
SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report
SERI	Systems Energy Resources, Inc.
SHPO	State Historic Preservation Office
SI	Site Investigation
SJRCDC	South Jersey Resource Conservation and Development Council
SO ₂	sulfur dioxide
SO _x	sulfur oxide(s)
Sv	sievert
SWPCF	Southern Water Pollution Control Facility
TDS	total dissolved solids
TEL	threshold effect level
TLAA	time-limited aging analysis
TS	Technical Specification
TSS	total suspended solids
UFSAR	Updated Final Safety Analysis Report
URSGWC	URS Greiner Woodward Clyde
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VAC	volts alternating current
VOC	volatile organic compound
W	watt(s)
yr	year(s)

Appendix A

Comments Received on the Environmental Review

Appendix A

Comments Received on the Environmental Review

Part I – Comments Received During Scoping

On September 22, 2005, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent in the *Federal Register* (Volume 70, page 55635) to notify the public of the NRC staff's intent to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, to support the renewal application for the Oyster Creek Nuclear Generating Station (OCNGS) operating license and to conduct scoping. The plant-specific supplement to the GEIS has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) guidance, and Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51). As outlined by NEPA, the NRC initiated the scoping process with the issuance of the *Federal Register* Notice. The NRC invited the applicant; Federal, State, and local government agencies; Native American Tribal organizations; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meetings and/or by submitting written suggestions and comments no later than November 25, 2005.

The scoping process included two public scoping meetings that were held at the Quality Inn in Toms River, New Jersey, on November 1, 2005. More than 100 members of the public attended the meetings. Both sessions began with NRC staff members providing a brief overview of the license renewal process and the NEPA process. After the NRC's prepared statements, the meetings were open for public comments. Thirty-three attendees provided oral statements that were recorded and transcribed by a certified court reporter. The meeting transcripts are an attachment to the December 8, 2005, Scoping Meeting Summary. In addition to the comments received during the public meetings, three comment letters were received by the NRC in response to the Notice of Intent.

At the conclusion of the scoping period, the NRC staff and its contractors reviewed the transcripts and all letters to identify specific comments and issues. Each set of comments from a given commenter was given a unique identifier (Commenter ID), so that each set of comments from a commenter could be traced back to the transcript or letter by which the comments were submitted. Specific comments were numbered sequentially within each comment set. Several commenters submitted comments through multiple sources (e.g., afternoon and evening scoping meetings). Public comments and the NRC staff responses to those comments were published in the OCNGS Scoping Summary Report issued on March 21, 2006, prior to the draft SEIS. Within-scope comments and responses have been reprinted without modifications as Part I of Appendix A of this SEIS.

Appendix A

Table A.1 identifies the individuals who provided comments applicable to the environmental review and the Commenter ID associated with each person's set(s) of comments. The individuals are listed in the order in which they spoke at the public meeting, and in alphabetical order for the comments received by letter or e-mail. To maintain consistency with the Scoping Summary Report, the unique identifier used in that report for each set of comments is retained in this appendix.

Specific comments were categorized and consolidated by topic. Comments with similar specific objectives were combined to capture the common essential issues raised by the commenters. The comments fall into one of the following general groups:

- Specific comments that address environmental issues within the purview of the NRC environmental regulations related to license renewal. These comments address Category 1 or Category 2 issues or issues that were not addressed in the GEIS. They also address alternatives and related Federal actions.
- General comments (1) in support of or opposed to nuclear power or license renewal or (2) on the renewal process, the NRC's regulations, and the regulatory process. These comments may or may not be specifically related to the OCNGS license renewal application.
- Questions that do not provide new information.
- Specific comments that address issues that do not fall within or are specifically excluded from the purview of NRC environmental regulations related to license renewal. These comments typically address issues such as the need for power, emergency preparedness, security, current operational safety issues, and safety issues related to operation during the renewal period.

Comments applicable to this environmental review and the NRC staff's responses are summarized in this appendix. The parenthetical alphanumeric identifier after each comment refers to the comment set (Commenter ID) and the comment number. This information, which was extracted from the OCNGS Scoping Summary Report, is provided for the convenience of those interested in the scoping comments applicable to this environmental review. The comments that are general or outside the scope of the environmental review for OCNGS are not included here. More detail regarding the disposition of general or inapplicable comments can be found in the Scoping Summary Report. The Agencywide Document Access and Management System (ADAMS) accession number for the Scoping Summary Report is ML060530691. This accession number is provided to facilitate access to the document through the Public Electronic Reading Room (ADAMS) (<http://www.nrc.gov/reading-rm.html>).

Table A-1. Individuals Providing Comments During Scoping Comment Period

Commenter ID	Commenter	Affiliation (If Stated)	Comment Source ^(a)
OS-A	Tom Jackson		Scoping Meeting
OS-B	Mike Mercurio	St. Francis Environmental Ministry	Scoping Meeting
OS-C	Ed Frydendahl		Scoping Meeting
OS-D	Don Warren		Scoping Meeting
OS-E	J. Simonair		Scoping Meeting
OS-F	Ed Stroup	International Brotherhood of Electrical Workers Local 1289	Scoping Meeting
OS-G	Bud Swenson	AmerGen Energy Company, LLC	Scoping Meeting
OS-H	Fred Polaski	Exelon	Scoping Meeting
OS-I	Tom Cervasio	EnviroWatch	Scoping Meeting
OS-J	Wayne Romberg		Scoping Meeting
OS-K	Judith Cambria		Scoping Meeting
OS-L	Bud Thoman	International Brotherhood of Electrical Workers Local 94	Scoping Meeting
OS-M	Chip Gerrity		Scoping Meeting
OS-N	Don Williams		Scoping Meeting
OS-O	Nancy Eriksen	Natural Resource Education Foundation	Scoping Meeting
OS-P	Paula Gotsch	Grandmothers, Mothers, and More for Energy Safety	Scoping Meeting
OS-Q	Suzanne Leta	New Jersey Public Interest Research Group	Scoping Meeting
OS-R	Kelly McNicholas	Sierra Club	Scoping Meeting
OS-S	Chris Tryon		Scoping Meeting
OS-T	Jay Vouglitois		Scoping Meeting
OS-U	Terry Matthews		Scoping Meeting
OS-V	Roberto Weinmann		Scoping Meeting
OS-W	Ed Hogan, Sr.	Concerned Citizens for America	Scoping Meeting
OS-X	Ed Hogan, Jr.	Concerned Citizens for America	Scoping Meeting
OS-Y	Rod Sterling		Scoping Meeting
OS-Z	David Most		Scoping Meeting
OS-AA	Peggi Sturmfels	New Jersey Environmental Federation	Scoping Meeting
OS-AB	Jeffrey Brown		Scoping Meeting
OS-AC	Jennifer M. Watley		Scoping Meeting
OS-AD	Ron Watson		Scoping Meeting
OS-AE	Donald Posey		Scoping Meeting
OS-AF	Judy Moken		Scoping Meeting
OS-AG	Diane Eleneski		Scoping Meeting
OS-AH	Jennifer Sampson, Nicole Simmons	Clean Ocean Action	Letter (ML053120157)
OS-AI	Bob Scro, Michael DeLuca	Barneгат Bay National Estuary Program	Letter (ML053220253)
OS-AJ	Clifford J. Day	U.S. Fish and Wildlife Service	Letter (ML053360432)

(a) The afternoon and evening transcripts can be found under accession number ML053400397.

A.1 Comments and Responses

Comments in this section are grouped in the following categories:

- A.1.1 Surface-Water Quality, Hydrology, and Use
- A.1.2 Aquatic Ecology
- A.1.3 Terrestrial Ecology
- A.1.4 Threatened and Endangered Species
- A.1.5 Air Quality
- A.1.6 Land Use
- A.1.7 Human Health
- A.1.8 Socioeconomics
- A.1.9 Alternate Energy Sources
- A.1.10 Postulated Accidents
- A.1.11 Uranium Fuel Cycle and Waste Management

A.1.1 Comments Concerning Surface-Water Quality, Hydrology, and Use

Comment: At other public meetings, some raised questions about our use of chlorine. We do use chlorine to keep the plant's condenser tubes clean and improve the efficiency of the plant. However, it's virtually nondetectable by the time it gets out of the condenser, and it certainly is not toxic to fish or any other living organisms. In addition, we are well below the allowable amounts of chlorine allowed by our discharge permits. (OS-G-9, OS-G-23)

Comment: The issue with chlorination, constantly dumping this chlorine. For the man to make a statement that chlorine is not toxic to fish, I've had an aquarium, and one of the first things you do in an aquarium is you dechlorinate the water before you put it in, or it will kill your fish. Granted, you can dilute it down to quantities that may be acceptable, but to say that it's not having an environmental impact is not – is not correct science. Because of this, this is why I'm focusing my environmental question on, again, the leakage from the plant and the radioactivity from this leakage from this plant. Without a closed-loop system, this extra contamination from Oyster Creek is ending up in our environment, because these leaks aren't all going into controlled areas. These leaks are going into the recirculating cooling-water area because of the design of the plant. So this is an environmental concern that I feel must be taken into consideration when deciding to issue an environmental permit for Oyster Creek in this licensing renewal. (OS-D-10)

Comment: We minimize the use of chlorine as a biocide. And by the way, all power plants that have once-through condensers use biocide. That's – I mean, all over the State, that's the way it is unless you've got a cooling tower. (OS-J-6)

Response: *The release of contaminants to surface-water bodies is a Category 1 issue that has been evaluated in the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS). All effluent discharges are regulated under the provisions of the Clean Water Act and the implementing effluent guidelines, limitations, and standards established by the U.S. Environmental Protection Agency (EPA) and the States. Conditions of discharge for the Oyster Creek Nuclear Generating Station (OCNGS) are specified in its New Jersey Pollutant Discharge Elimination System (NJPDES) permit. The comment provides no new information and will not be evaluated further.*

Comment: The question is, it seems, that the flow of the Forked River may have changed the pattern under which sediments are deposited in the ground of the river and the adjacent lagoons that are along the Forked River. And I think there are navigational and recreational difficulties because of these deposits that don't allow you to get in and out unless you (inaudible) every time. So can something be done and it was done apparently by the plant 10 years ago. The question is, can this be repeated or can something be done about it? (OS-V-1)

Response: *The commenter suggests that station operation has resulted in an altered flow pattern in the Forked River that may be contributing to shoaling at the mouth of the finger canals. The impacts associated with alteration of current patterns due to station operation were considered in the GEIS. Section 4.2.1.2.1 of the GEIS specifically discusses the operation of OCNGS with respect to the impacts associated with the alteration of flow in both Forked River and Oyster Creek. The GEIS states that substantial hydrological and water-quality changes in the Forked River and Oyster Creek resulted in only minor effects in Barnegat Bay. Also according to the GEIS, "changes to current patterns are of small significance if they are localized near the intake and discharge of the power plant and do not alter water use or hydrology in the wider area." Although the U.S. Nuclear Regulatory Commission (NRC) staff does not dispute the possibility that station operation is causing the shoaling and would also do so during the period of extended operation, the NRC staff finds that the GEIS broadly addressed this issue and finds that no new and significant information exists to suggest that the conclusion in the GEIS is no longer valid. In the past, the licensee has periodically dredged portions of the Forked River and Oyster Creek to maintain adequate depth. With respect to future remediation of the shoaling problem, the NRC staff believes that this is outside the scope of its National Environmental Policy Act (NEPA) of 1969 review; nonetheless, the phenomenon will be discussed in the Supplemental Environmental Impact Statement (SEIS).*

A.1.2 Comments Concerning Aquatic Ecology Issues

Comment: The second reason that we sample at Oyster Creek is to protect the environment. We sample the air and the water that leaves the plant to make sure that we have a minimum impact on the environment. We not only meet State and Federal regulations, but often we beat them. We're extremely proud of our record as a zero-release plant, and we continually improve

Appendix A

our operating procedures as we discover new ways to be better environmental stewards.
(OS-AC-2)

Comment: I know that the DEP [Department of Environmental Protection] has jurisdiction over their water discharge permit, and I don't know – actually, I'd like to ask how much jurisdiction the NRC [U.S. Nuclear Regulatory Commission] has over that, and whether you actually look at whether Oyster Creek is complying with the Clean Water Act, or if that is simply a matter for the DEP to consider, because it's unclear to me what is the truth in that. I mean, I know the DEP does, but I don't know what the NRC's role is in that. So just to be clear in terms of Oyster Creek's water impact into the local waterways, and to Barnegat Bay, that since Oyster Creek was built in 1969, the plant's operation has really resulted in very far-reaching and long-lasting environmental degradation to nearby waterways, including Forked River, Oyster Creek, and Barnegat Bay. And, unfortunately, as it stands right now, the DEP's draft water permit does let the plant off the hook, and I would hope that the NRC would not do the same, if you do have jurisdiction, any type of jurisdiction over this. (OS-Q-1)

Comment: Chlorine is injected through each of the circulating pumps daily to prevent and remove fouling organisms such as bacteria. Maximum chlorination occurs in the summer months when water temperatures peak and fish eggs and larvae are most abundant in the zooplankton and invertebrate and fish numbers peaks.

- 1) Chlorine directly kills phyto- and zooplankton entrained in the cooling system and can impact organisms residing in the discharge canal and surrounding waters.
 - a) Chlorine begins to be lethal to marine organisms at 0.01 mg/L but tolerance is significantly lowered by high temperatures and physiological condition of the organisms.
 - b) OCNCS [Oyster Creek Nuclear Generating Station] has a permitted daily maximum discharge limit of 0.20 mg/L of chlorine into the discharge canal, 20 times higher than the lethal limit of many estuarine organisms including striped bass, mummichogs and bunker. One chlorine related fish kill resulted in the death of 500 Atlantic menhaden in January of 1974.
- 2) Toxic residual organic compounds (chloramines) are a byproduct of chlorination, which persists in the canal and effluent resulting in long-term exposure to fish and other aquatic organisms residing in the canal and plume area.
- 3) Radionuclides are released from OCNCS and bioaccumulate throughout the estuarine food web. Reactor-released radionuclides (⁶⁰Co, ¹³⁷Cs, and ⁵⁴Mn) have been detected in water, bottom sediments, benthic marine algae, seagrass, hard clams, blue crabs, bunker, winter flounder, summer flounder, bluefish, and several other fish. Organisms collected near Oyster Creek had the highest levels of radionuclides but detectable levels were found through out the bay. Recent sediments collected near the discharge canal contained levels

of ^{60}Co that were up to 63 times higher than sediments collected at other locations within the Barnegat Bay-Little Egg Harbor estuary.

- 4) The current NJPDES [New Jersey Pollutant Discharge Elimination System] permit for OCNGS indicates a maximum daily limit of 15 ppm [parts per million] of PAHs [polycyclic aromatic hydrocarbons] can be discharged from 5 of their outfall pipes. The sources of this contaminant are not clear. (OS-AH-4)

Response: *The discharge of nonradioactive contaminants in the cooling water of the station, including chlorine and polycyclic aromatic hydrocarbons (PAHs), is limited by the NJPDES permit. Implementation of the Clean Water Act provisions is the responsibility of the EPA, and the EPA often delegates such authority to the State as is the case with New Jersey. The state of New Jersey, not the NRC, sets the limits of effluents according to the Clean Water Act. This issue was evaluated generically in the GEIS, and absent new and significant information, the NRC staff adopts the conclusions in the GEIS. With respect to nonradioactive contaminants, the comments provide no new information and will not be evaluated further.*

A comment was made concerning bioaccumulation of radionuclides in the estuarine food web. The NRC staff's review of the license renewal application includes an evaluation of offsite releases of radionuclides from OCNGS, including their movement through the food web. The results of this evaluation will be discussed in the SEIS.

Comment: At Oyster Creek we do everything we can to protect the Barnegat Bay. We have a constant focus on planning and executing our work to minimize the impact to the environment. On a day-to-day, hour-to-hour basis, we monitor water temperatures. We regularly take water samples to ensure compliance with regulations. We also coordinate any planned load reductions and shutdowns to avoid the risk to marine life. This practice is often costly, but it's essential to meet our commitment to the environment. Just this past weekend we performed a routine power reduction, and, due to our environmental team, there was no environmental impact. (OS-G-8, OS-G-22)

Comment: The employees at Oyster Creek – and there are about 450 of them – are highly trained and environmentally sensitive. We're a zero-discharge plant. We have modified their turbine cooling-water intake to be fish-friendly with soft sprays to return fish to the environment. Our intake screens are sized to be environmentally friendly. So we've changed some things over the years to make the plant more friendly to the environment. (OS-J-3)

Comment: Our startups and shutdowns, we have worked very hard in the last couple of years to do very slow startups and slow shutdowns, because that's environmentally friendly. And since we've started doing that, we've had no fish kills as a result. The fish don't like a fast change of temperature. (OS-J-5)

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Comment: It's a well-known fact that the best fishing in the area, in Ocean County, is on Route 9 on the Oyster Creek discharge. You can go down there this afternoon and count the fishermen and count the fish they're getting. You know, I anchor my boat. I have an environmentally-friendly sailboat. We anchor it in Oyster Creek. We get blue shell crabs there. We swim there. You know, we feel good about it. (OS-J-8)

Comment: Oyster Creek is also involved in several environmental projects. Most recently, we purchased a boat for the Rutgers Extension Service Clam Restoration Project. The project team is working on reestablishing clam beds in the Barnegat Bay, and the boat will be used to more efficiently implement the restoration of the clam beds and other important environmental projects in the future. (OS-G-11, OS-G-25)

Comment: And anybody that's coming up with these cockeyed stories about, oh, they need water towers, no, they don't need water towers. The system they have is fine. The water flows in, and it flows out, and they do a good job. (OS-N-2)

Comment: I heard a couple of statements made tonight that I feel obligated to correct. One is that Oyster Creek is in violation of the Clean Water Act. That is simply not true. Oyster Creek could not operate today if it was in violation of the Clean Water Act. Oyster Creek currently operates under a New Jersey Pollutant Discharge Elimination System Permit that was issued by the New Jersey Department of Environmental Protection. That would not be possible if they were in violation of the Clean Water Act. That is a false statement.

Secondly, I heard someone say that there are far-reaching and long-lasting environmental degradation occurring due to the operation of the existing once-through cooling system. Well, there was a very thorough independent evaluation of this once-through cooling system that was done prior to the issuance of the permit that I referred to a second ago. The permit was issued in 1994. Before issuing the permit, the DEP hired an independent consultant called Versar to evaluate all of the studies, and there were some 20 years of intensive studies that were done on the cooling system at Oyster Creek. I know because I participated in many of them. If I wasn't actually doing the work, I participated in the design of the studies. I oversaw the hiring of the consultants. I looked over those – their shoulders as they did the work. I'm very familiar with this work. But it's not my opinion that's important. It's the opinion of the independent expert that was hired by the New Jersey Department of Environmental Protection prior to the issuance of the current permit. That independent consultant – Versar – was asked to determine if the existing once-through cooling system complied with Sections 316(a) and (b) of the Clean Water Act. Based upon the results of their review, Versar and the NJDEP, in the permit that they issue, concluded that the continued operation of the Oyster Creek Nuclear Generating Station at the estimated levels of losses to representative important species populations – and these are the losses due to the impingement and entrainment that you heard people talk about. Continued operation at those levels of losses, without modification to the intake structures and/or operating practices – again, without modification to the intake structure, does not

threaten the protection and propagation of balanced indigenous populations in Barnegat Bay. That's a direct quote from the DEP's independent consultant. It's not opinion. It's not AmerGen's or Exelon's opinion.

It's worth noting that Versar, the consultant that the DEP hired, was not shy about asking to have power plants modify their cooling-water intakes. As a matter of fact, a few months before they initiated the evaluation of Oyster Creek, they finished one up on the Salem nuclear generating station. And based upon the results of their evaluation of that cooling system, they called for a 50 percent reduction in cooling-water flow, which is essentially calling for backfitting, closed-cycle cooling. So they weren't afraid to say that Oyster Creek needed to modify their cooling system. But, in fact, they determined the opposite – that it didn't need to be modified. A couple of the other conclusions that they and the DEP came to, that I'd like to share with you, that are contrary to some of the assertions that were made tonight, include – and these are direct quotes. “The losses due to impingement at the Oyster Creek Nuclear Generating Station were of no consequence to the compliance determination.” Losses due to impingement of no consequence to the compliance determination. Discharge effects, contrary to the fact that you heard that there is a thermal plume that goes all the way across the bay, causing all kinds of havoc, the DEP's independent consultant concluded, I quote, “Discharge effects are small and localized and have no adverse consequences to Barnegat Bay.”

They go on to conclude, I quote, “Based on findings summarized in this report, balanced indigenous populations of Barnegat Bay are protected under Oyster Creek's current operations.” I quote, “Plant-related losses at the Oyster Creek Nuclear Generating Station do not adversely impact spawning and nursery functions.” I quote, “Plant-related losses at the Oyster Creek Nuclear Generating Station do not adversely affect the estuarine food web of Barnegat Bay.” I quote, “Plant-related losses at the Oyster Creek Nuclear Generating Station do not adversely impact the beneficial uses of Barnegat Bay.” This is contrary to the comment that I heard a few minutes ago that the alleged degradation of the bay is having a negative impact on the economy. These are not my conclusions. These are the conclusions of an independent expert hired by the Department of Environmental Protection. (OS-T-1, OS-T-2)

Comment: Now we're here to talk about the environment and I had addressed the DEP last week and I read a statement, but I'd like to get a little bit more informal as far as our screen-wash system that actually protects our marine life. I believe that we have a minimal effect on our marine life as far as impingement or entrainment on our screen-wash system. (OS-Z-3)

Comment: So my point being too is I'm a fisherman out in Barnegat Bay. I used to clam when I was a kid. And the only problem that I see out in Barnegat Bay is our limits. Now the state of New Jersey limits our catch as far as striped bass. Now there was a low with striped bass I would say about 15 years ago, you couldn't barely catch a striped bass because they were pretty much fished out. Well, what happened is the State stepped in and they limited the catch limit. Well now if you look at the population in Barnegat Bay as far as our striped bass

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population, it's huge. I mean we're catching alligators out there and it's great. And our weakfish are the same.

So my point to the people that are saying that Oyster Creek has a negative effect on Barnegat Bay, I totally disagree with them because if that was a fact, they would never come back. Now as far as our clams, I used to clam for a living too. And I remember Cattrell's – remember Cattrell's in Waretown? Well, we used to go clamming and everybody knows where the batting ring is when baseball players put a batting ring on a bat to make it heavier. Well, these clams, you'd have to fit the clams through a batting ring and they would consider them a cherrystone. Well, when I was a kid, that's what we used to do to make a living. We used to actually clam, and we'd drop the clams off at Cattrell's and the clams used to fit through the batting ring and they were considered cherrystone. You'd get more money for cherrystones. But through the years, as our area has developed in Lacey Township, along with all our neighboring towns, the population has just exploded. So what happens to our clams? They get fished out. So we need time to let them reproduce, and I'm confident in time that our clam population will increase as well as our striped bass and our weakfish. (OS-Z-6)

Comment: In the environmental area, I'm proud to say that during the last refueling outage, we shut the plant down, performed the refueling, and restarted the plant with zero impact to the environment. And that's because of being good stewards of taking the time and getting the people involved from the chemistry organizations to the outside organizations to analyze the plant's impact to the environment and implementing that into the scheduling itself. So we took additional time to shut the plant down. We had people stationed out at the discharge canal and we had zero impact on the fish and the marine life out there. So that proves to me that Oyster Creek is a good steward, and it should be relicensed for another 20 years. (OS-AE-2)

Comment: Environmentally, I'm a local in Ocean County. I know firsthand people who fish right around the plant. They say they've never caught such big fish in their life, or crabs for that matter and none of them I've seen who I've known through the years and I've been here for years, none of them have come down with cancer, none of them are turning green and none of them are glowing in the dark. That's one thing I can say. And the gentleman from Forked River who's lived here for his life and he's in the Republican Party, he's told you that he sees more bass in the bay, that's probably due to conservation, but one thing you can say it's not because Oyster Creek is destroying those fish. If anything, it's helping those fish spawn. (OS-X-3)

Response: *The comments are, in general, supportive of the existing once-through cooling system of OCNCS, and no specific response is provided. The SEIS will address the impacts of the once-through cooling system as well as those associated with an alternative closed-cycle system.*

Comment: It's common knowledge that the state of New Jersey and the DEP is trying to force them to build a cooling tower. The cooling tower, according to my understanding, is not under

the NRC, that you are actually reviewing it based on the approved method of operation. So the question is, is this cooling tower or what amounts to blackmail, they're asking for 3500 acres in order for the State to give them this water commitment separate from you? What impact does that have on your environmental statement? (OS-U-1)

Response: *The NRC's responsibility under NEPA is to provide a fair and comprehensive analysis of potential impacts related to the proposed action, to evaluate alternatives, and suggest mitigation if deemed necessary. Approval of a cooling-system design is the responsibility of the EPA, which has delegated that responsibility to the state of New Jersey. The NRC will evaluate the impacts of the existing once-through cooling system as well as those associated with an alternative closed-cycle cooling system, and an alternative that includes modifications to the existing system and wetland restoration.*

Comment: So even as of 1981, the technology that existed then, one of the areas from time to time was the water purification section – (inaudible) recovery towers, (inaudible) recovery towers, various aspects. And when the water was discharged into the (inaudible) River, which occurred in most of the (inaudible) – the by, the ocean – (inaudible) tanks (inaudible) clean water as of (inaudible). Now, we had found earlier, based on (inaudible), that both Federal and State organizations (inaudible) that the Hope Creek, New Jersey, atomic power plant (inaudible). And now (inaudible), we had a (inaudible) recovery time and (inaudible). I'm not aware of a fish kill at (inaudible) Creek. At the Oyster Creek facility, to my knowledge, (inaudible). But I'm aware of (inaudible) not one, but three massive fish kills. We have learned today that the Oyster Creek facility still does not have (inaudible). We have heard from two gentlemen – this surprised me – that they are environmentally conscious. They are conscious of (inaudible). The discharge site needs further work. We need a water cooler (inaudible) there on the discharge site. We do not need these fish kills anymore. Part of the renewal process for this license should be a consideration of a coolant tower should be built. (inaudible) one at Hope Creek. We need one at Oyster Creek. (OS-A-1)

Response: *Although, unfortunately, much of the comment was not captured in the transcript, the NRC staff believes that the commenter intended to express concern about fish kills that resulted from plant operations and to suggest that conversion to a closed-cycle cooling system using a cooling tower would be advisable. In the SEIS, the NRC staff will consider the effects of converting to a closed-cycle cooling system at OCNGS.*

Comment: Oyster Creek's present water and intake system destroys marine life. In the year 2002, the plant was fined \$50,000 for killing 5,876 fish. If the Oyster Creek plant does not construct a cooling tower, the plant will continue to contribute to the loss of habitat in the remaining estuary, so, therefore, the plant should be shut down. (OS-I-6)

Comment: The point I'm trying to make here is they talk about the environmental impact. There's a tremendous environmental impact when Oyster Creek continues to operate every

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day. The fact that they are unwilling to spend the money for a cooling tower, which is exactly what it comes to – everybody has seemed to look at it, including the Environmental Protection Agency, and say this is the best alternative, yet Oyster Creek is looking for the cheaper way out. This is not true community concern. (OS-D-9)

Comment: And I do truly believe that the environmental impact on the aquatic life and overall – not just fish, all others, has been very, very devastating. And we are so overfishing as it is out there, once they get bigger that we need to be able to have as many possible make it to that point, and so they can become part of our food supply. So I'm very concerned about that. (OS-K-2)

Comment: I don't want to see any more fish kills. I saw enough of them. I saw striped bass three and four feet long when I lived in Lacey floating in that creek because of that plume that comes out of there, that hot water. We were told before by somebody from the plant that they add cool water to it. Again, my question to the people at AmerGen – four miles out in Barnegat Bay that plume continues to send warm water out into the bay. You can't tell me that that's not affecting the ecosystem and the environmental condition of Barnegat Bay. And I don't care what kind of an engineer you are, or where you went to school, or what you studied, I'm taking it from a fisherman and an environmentalist who says that warm water should not be shot out there. (OS-C-4)

Comment: The other thing that should be addressed is the fact that the coolant – the cooling of the water into Barnegat Bay can be very easily solved as heat recovery systems can be put in along the area, hydroponics, different areas. Forty years ago, we had a system – we had a bay that was full of life. Today it's – our oceans are 90 percent depleted. (OS-B-5)

Comment: You know, the once-through cooling system that was designed in the 1960s simply isn't sufficient to fix the problems that have been going on for so long in terms of intake and water discharge. You know, to describe – I don't know if anyone has done this yet, so I'm going to do this – I hopefully am not repeating what someone else has already said. But for the public's knowledge, I want to describe how the system works. Essentially, the heated water – excuse me, the – first, the system intakes water from Forked River to cool the reactor, and then the heated water, which is then called thermal pollution, is then discharged into Oyster Creek. And the plant actually intakes and discharges over 1.4 billion gallons of water every day. The water is taken in at a speed of about 1 to 2,000 cubic feet per second. That's actually the force of a medium-sized river. The chlorine levels in the water are also about 20 times the lethal level of many different types of aquatic life. And there are grates over the intake system, but because the water is flushed in at such a high speed, it creates a very – it's kind of like a giant sucking action, and that brings in an assortment of aquatic life. Some of it is small, some of it is larvae that flows right through the grate, and it's killed in the process of cooling the reactor. And that effect is called entrainment. And then, larger types of aquatic life – and those include sea bass, they include white perch, they also include endangered sea turtles. Although it's great to hear

that you're looking at birds, that's an endangered species that, unfortunately, you do not address. Those creatures actually get pinned on the grate and often die from it and/or seriously injured, and that lethal effect is called impingement. So you have entrainment, where water is going through the system, and then you have impingement, when aquatic life is being impinged upon the grate.

So in addition to that, Oyster Creek's daily thermal pollution discharge often spreads a thermal plume, and that can be over a distance of four miles across the bay. It's actually the entire width of the bay. It creates a fry zone for young larvae, and the NRC has actually done studies and indicate that the thermal plume has increased the population of the tropical wood-boring species that, you know, serve kind of as aquatic termites in the area.

So, you know, all of these problems associated with Oyster Creek's water intake and discharge system actually put it in violation of the Clean Water Act, because that specific Act requires the plant to install modern technology that actually fixes the problem, and, fortunately for us, that technology is available. That technology is called a closed-cycle cooling system. There are different types of these types of systems. Oyster Creek will talk about how, you know, it will have more environmental problems than without it, but the reality is that we know – and the DEP has stated this several times – that, in fact, it won't result in any kind of environmental problems. In fact, it will really fix the root cause of the problem, because it actually reduces the amount of water going into a system and being discharged out to the system by over 95 percent. And that's actually the way to solve that particular problem involved with Oyster Creek's environmental record.

So we know, again, that reduces the discharge and intake by over 95 percent, and that actually would save over 13 million fish and shellfish annually, and an estimated tens of millions of additional larvae annually. Unfortunately, the DEP permit right now, it doesn't require the plant to install a closed-cycle cooling system only. Unfortunately, it gives Oyster Creek the option of restoration. If you're going to use restoration, you should use it as a penalty for violating the Clean Water Act for the past 35 years. You should not use it as an alternative to modern technology. That can actually solve the root cause of the problem.

And I would hope that the consideration of this particular issue, and of a closed-cycle cooling system, would be part of the NRC's environmental scoping record, and actually would look at the DEP's best professional judgment, which is stated, although it – although it allows for restoration, if you take a look at that permit, it says specifically that closed-cycle cooling will actually fix the problem. So that's the first thing I wanted to state on the record. (OS-Q-2)

Comment: In addition to that, I wanted to just again reinforce – I know you look at aquatic life and aquatic ecology. You want to make sure that you're looking very closely at Oyster Creek's intake and discharge. (OS-Q-12)

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Comment: However, given our mission, Clean Ocean Action's current focus is on the marine degradations caused by the plant. An immediate and significant issue for the marine environment, linked to the re-licensing, is the renewal of the required pollution discharge permit. Oyster Creek Nuclear is currently operating under a New Jersey Pollution Discharge Elimination System permit (hereinafter "NJPDES permit") that expired in 1999 and has been "administratively extended" by the NJ Department of Environmental Protection (hereinafter "NJDEP"). This permit, originally issued in 1994, is outdated (to say the least) and results in significant harm to the marine environment. Fortunately, new Phase II regulations require implementation of the "best technology available to minimize the adverse environmental impact." Revising the plant's NJPDES permit to comply with Phase II regulations offers one of the most important opportunities to improve Barnegat Bay.

NJDEP is currently drafting a new NJPDES permit, which will implement the new Phase II regulations. This draft permit must be evaluated and viewed as an essential, rare opportunity to substantially improve the marine environment of Barnegat Bay. COA will analyze and comment on the permit application and will work to ensure that the new permit is consistent with federal and state laws, and adequately resolves OCNGS' current marine degradation issues, especially those related to the antiquated once-through cooling system. Put simply, once through cooling water systems cause substantial negative impacts to waterways. OCNGS' current cooling water intake structure causes severe adverse effects on the Barnegat Bay marine environment due to impingement, entrainment, thermal discharge, and chlorination. These impacts, which can be substantially minimized by installing a closed-cycle cooling system, are described below. From the outset, it is important to note, that an extensive scientific literature review has revealed that all available data on impingement and entrainment at the plant are the result of studies performed and/or funded by the Oyster Creek Nuclear Generating Station.

OCNGS currently operates using a once-through cooling system in which approximately 1.4 billion gallons of water passes through daily. OCNGS discharges more water into Barnegat Bay than any other industrial or commercial user. Water is drawn into the plant via the Forked River (Intake Canal) and released via Oyster Creek (Discharge Canal), which drains into Barnegat Bay. Both the river and creek were dredged and the flow of the southern portion of Forked River was actually reversed to accommodate the water needs of the plant. The activities of the plant change the salinity, water temperature and dissolved oxygen levels in and around the facility and release radionuclides that can be detected all the way up the food web. Specific environmental impacts related to the intake and discharge canals follow. The intake canal produces significant flow velocities depending on the number of circulating pumps in operation. The consequence is both impingement and entrainment of aquatic organisms.

Impingements occur when organisms are too large to pass through the 9.5-mm screens and are trapped against the trash racks and intake screens from the force of the water being pumped from the intake canal.

- 1) Plant records indicate 32 impingement and 14 mortalities of endangered sea turtles since 1992. These data include the following species specific incidents:
 - a) 21 impinged Kemp's Ridley Sea Turtles with 9 mortalities.
 - b) 7 impinged Loggerhead Sea Turtles with 2 mortalities.
 - c) 4 impinged Green Sea Turtles with 1 mortality.
 OCNGS exceeded their annual incidental take in 2004 when 8 juvenile Kemp's Ridley Sea Turtles were impinged and 3 were killed in the 3 month period from July 4 to September 23. An Incidental Take Assessment by the National Marine Fisheries authorized an annual limit of 4 Kemp's Ridley's (with no more than 3 mortalities), 5 Loggerheads (with no more than 2 mortalities) and 2 Green's (no more than 1 mortality).
- 2) A study conducted from September 1975 through August 1977 reported impingement of 13 million fish and invertebrates during this period.
- 3) A second study conducted from November 1984 through December 1985 reported impingement of 22 million fish and invertebrates (with 7 million impinged in December 1985 alone).

Entrainments occur when small organisms pass through the 9.5-mm screens and enter the cooling system. These smaller organisms generally consist of plankton and fish and invertebrates in the many early life stages. The facility increases water usage (and thus flow) during the summer months, which coincides with peak concentrations of eggs, larvae and plankton in the water column. A study conducted from September 1975 through August 1977 reported 9.19×10^{13} microzooplankton (<500 μm in size including several species of copepods and clam, snail, worm and barnacle larvae) and 4.24×10^{11} macrozooplankton (>500 μm in size including jellyfish, sand shrimp, grass shrimp, larvae of sand lance and American eels, eggs and larvae of winter flounder, and several crab species.) were entrained during this time period. Once entrained, the organisms are subjected to numerous and potentially fatal insults including:

- 1) Thermal shock from the sudden increase in water temperature (12–13 °C).
- 2) Shear and pressure forces from high water velocity and trapped air.
- 3) Mechanical stress from contact with machinery, pumps, etc.
- 4) Lethal levels of chlorine injected daily into the condenser section to reduce biofouling.

The once-through cooling system used by OCNGS results in an increase in water temperature (between 22-33 °F) between the intake and discharge canals. Water temperature in the discharge canal can reach 110 °F, which affects the behavior, physiology and habitat utilization of aquatic organisms in the area. The elevated temperature in the discharge canal and surrounding waters induces behavioral changes that have been documented in important managed species such as bluefish, fluke, winter flounder, and tautogs. Some of these behavioral changes include:

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- 1) Avoidance of parts or all of Oyster Creek by certain species during summer and early fall.
- 2) Attraction to parts or all of Oyster Creek during winter when they should have migrated out of the area due to cold temperatures. Failure to migrate can lead to large-scale mortality (due to thermal shock) when the plant experiences a planned or emergency shut down.
 - a) Records from January 1972 through December 1982 reported 2,404,496 fish were killed due to thermal shock including Atlantic menhaden, bay anchovy, bluefish, striped bass and weakfish.
 - b) An emergency shutdown on January 21, 2000 caused a 17 °F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 32 °F resulted in the death of about 3500 fish including 2980 striped bass.
 - c) An emergency shutdown on November 11, 2001 caused a 70 °F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 48 °F resulted in the death of about 1407 fish.
 - d) A scheduled shutdown on September 23, 2002 caused the water in the discharge canal to increase to 101 °F in less than an hour and resulted in the death of about 6000 fish. AmerGen recently reached about a \$1 million dollar settlement over this incident.
- 3) Metabolic rate of organisms increases with increased temperatures resulting in decreased growth and survival, especially during summer months when ambient water temperatures are at their peak.
- 4) High water temperature decreases oxygen solubility in water and increases Biological Oxygen Demand ("BOD") resulting in dangerously low dissolved oxygen concentrations in the water.
- 5) Tropical/subtropical invasive species are able to thrive in the surrounding warm water plume. Two exotic shipworms (*Teredo barschi* and *T. furcifera*) have benefitted from the elevated temperatures with an increase in growth rate and length of breeding season along with reduced winter mortality, which lead to a population increase that has created problems for boat owners in the vicinity of the plume. (OS-AH-2)

Comment: Detectable Impacts of the OCNCS on the Aquatic Community

- 1) Reduced phytoplankton abundance at the mouth of Oyster Creek compared to other areas in the estuary. These impacts include lower diversity, a 30 percent decrease in gross productivity, a 20 percent decrease in net productivity and a 17.7 percent drop in biomass.
- 2) Changes in zooplankton abundance with some organisms showing increased abundance at the mouth of Oyster Creek than in the discharge canal (barnacle and polychaete larvae) while others showed a decrease in abundance (rotifers, snail larvae).

- 3) Reduced ichthyoplankton abundance in Oyster Creek compared to Forked River including eggs, larvae and juveniles of bay anchovy and goby and pipefish larvae.
- 4) The overall production loss of sand-shrimp due to impingement and entrainment associated mortality resulted in a direct population loss of 16.6 percent and an estimated annual net predator loss of 7,483 kg associated with the reduced forage production.
- 5) Economic loss of about 1 percent of potential hard clam fishery.

The above individual impacts need to be examined from an ecosystem perspective, including cumulative effects, to fully appreciate the overall effect of OCNGS on the surrounding habitat. Ecosystems level impacts include:

- 1) Impacts at the base of the food web (phytoplankton, zooplankton and ichthyoplankton) affect higher trophic levels with reduced prey availability and/or changes in preferred prey type.
- 2) Impacts on sensitive life stages such as eggs, larvae and spawning adults have obvious population-level effects.
- 3) Changes in water quality and temperature induce physiological stress to organisms that utilize the surrounding habitat. Physiological stress can confound the effects of other insults present in the Barnegat Bay estuary such as eutrophication and contaminant exposure.
- 4) Peak abundance of organisms coincides with increased water usage and chlorination by OCNGS, thus maximizing their impact on the aquatic community.

Because of the numerous adverse impacts cited above, OCNGS' antiquated once-through cooling system must be replaced with a closed-cycle cooling system for OCNGS to continue operations. The abuse of the Forked River and Barnegat Bay waters must be eliminated. (OS-AH-5)

Comment: Under new EPA regulations, OCNGS will be required to comply with Phase II regulations upon the imminent renewal of its NJDPES permit. Since OCNGS' NJDPES permit expired in 1999, the renewal of its permit will hinge on compliance with Phase II regulations.

Phase II Regulations implement Section 316(b) of the Clean Water Act (CWA). Section 316(b) of the CWA requires that the "location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact" (emphasis added).

Phase II Regulations mandate that OCNGS upgrade its system to meet specific performance standard requirements. The performance standards require a decrease in fish mortality due to

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impingement by 80-95 percent and a reduction in entrainment by 60-90 percent (depending on total capacity utilization rates).” An existing facility may choose one of five compliance alternatives for establishing the best technology available for minimizing adverse environmental impacts at the site.

COA finds, and strongly urges, that OCNGS install a closed-circuit-cooling system because such systems are the “best technology available for minimizing adverse environmental impacts.” Any other option simply does not reflect the best technology available for minimizing adverse environmental impacts. Habitat restoration or reductions in the performance standards due to a cost-benefit analysis are particularly inadequate alternatives. In fact, a study of the restoration project at Salem Nuclear Power Plant has shown that such restoration projects do not offset the loss due to the impingement and entrainment of marine organisms. Meeting the best technology available requirement is not only the law, but is also sound and reasonable.

It is also important to note that it is highly unlikely that OCNGS would be located where it is today if it were to comply with current siting laws. The Nuclear Regulatory Commission laws now state that “special precautions should be planned if a reactor is to be located at a site where a significant quantity of radioactive effluent might accidentally flow into nearby streams or rivers or might find ready access to underground water tables.” However, special precautions were not taken to ensure against such accidents during the siting of OCNGS.

In short, COA will be urging the NJDEP, as it drafts the NJPDES permit for OCNGS, to mandate the installation of a closed-cycle cooling system as a matter of law, good governance, and good neighbor policy.

- 1) The law requires implementation of the “best technology available for minimizing adverse environmental impact.”
- 2) Good governance requires protection of public resources and the quality of life.
- 3) A good neighbor enhances a neighborhood’s resources and the quality of life. (OS-AH-6)

Comment: During the past 35 years of operation at the OCNGS, there have been significant concerns regarding impingement, entrainment, and thermal impacts on estuarine and marine life. As a result, the Science and Technical Advisory Committee (STAC) of the BBNEP [Barnegat Bay National Estuary Program] convened a meeting on November 1, 2005, and drafted a number of recommendations for submission to the NRC regarding the OCNGS.

1. An independent, scientific body (similar to the National Academy of Science) must be assembled to coordinate and oversee surveys and studies on the impacts of the OCNGS on the Barnegat Bay/Little Egg Harbor estuary.

2. The NRC must require the OCNGS to focus on remediation of its direct impacts on estuarine and marine organisms in the Barnegat Bay/Little Egg Harbor estuary.
3. There have been very few studies of biotic communities in central Barnegat Bay during the past 25-30 years. Additional studies must be conducted in the Barnegat Bay/Little Egg Harbor to accurately assess the impacts of entrainment, impingement, and thermal discharges on estuarine and marine organisms.
4. The use of wetlands restoration as a mitigation measure must not be implemented in place of remediation efforts targeting bay populations and communities of organisms.

Based on the ongoing effects of the OCNGS on the estuarine ecosystem, the NJDEP and the NRC must mandate the implementation of the best available technology for intake structure design and operation of the OCNGS to mitigate impingement and entrainment losses. Section 316(b) of the Clean Water Act requires that the “location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.” This is the position endorsed by the BBNEP and its partners.

The BBNEP strongly recommends that the permit include a condition that charges the BBNEP with the role of the independent scientific body whose purpose is to coordinate research efforts in the Barnegat Bay relating to the effects of the OCNGS. The BBNEP’s Comprehensive Conservation and Management Plan (CCMP) recognizes the need for such an entity. Action Item 5.15 of the CCMP charges the BBNEP with establishing this technical group for the examination and coordination of data in order to understand OCNGS’s role in the overall ecological health of the bay.

Program partners agree that the BBNEP can and should have the lead role in coordinating and overseeing much-needed surveys and studies regarding OCNGS’s effects on the Barnegat Bay ecosystem.

In conclusion, the position of the BBNEP is that regardless of the option pursued by the NRC regarding Oyster Creek’s license renewal, without question, the OCNGS absolutely must be required to conduct detailed, comprehensive studies of the communities of bay organisms to determine what the overall impact of the power plant is on Barnegat Bay. (OS-AI-1)

Comment: The applicant has identified its preferred alternative as renewal of its operating license for an additional 20 years, without any plant modifications. The Service recommends that the applicant re-consider in its alternatives analysis the value to the aquatic environment of constructing a closed-loop cooling system or the employment of other project features (see below) that are designed to avoid or minimize adverse impacts to the aquatic environment. For example, the use of a closed-loop system would reduce intake cooling water volumes, when compared to the preferred alternative, by 90 percent (see the applicant’s Environmental Report

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page 7-19). Such an alternative would avoid many of the adverse environmental impacts that are currently occurring to the aquatic biota of Barnegat Bay (i.e., entrapment, entrainment, and thermal impacts).

The continued operation of the Oyster Creek Nuclear Generating Station poses individual and cumulative impacts on the human environment. The continued use of 1.25 billion gallons of water per day from Barnegat Bay represents an adverse impact to the bay's aquatic biota. The Service does not concur with the applicant's conclusion that the impacts associated with its proposed 20-year license renewal would be small and do not warrant mitigation (see page 6-4 or the applicant's Environmental Report). The intake velocities for plant cooling may approach 5.0 feet per second (fps). These velocities exceed the 0.5 fps criteria established for intake structures by the State (New Jersey Division of Fish, Game and Wildlife, undated). The U.S. Environmental Protection Agency's (EPA) establishment of a 0.5 fps velocity for all new cooling water intake structures that draw from rivers, streams, or ocean waters of the United States (40 CFR Part 125.84 [b][2]) is consistent with the State's requirements. Velocities of intake water that exceed 0.5 fps promote adverse impacts to aquatic resources due to entrapment or entrainment.

The Service recommends that the Draft EIS also include consideration of the following project features as a means to avoid or minimize impacts to the aquatic environment: placement of additional screening/netting or other project features (e.g., bubble or sound deterrent systems) in the intake canal closer to Barnegat Bay; employment of flow reduction options during low peak demands; construction of a large water impoundment or recirculation structure on the Finninger's Farm to supplement the plant's cooling water needs; or a combination of any of the above. (OS-AJ-5)

Response: *The comments, in general, express concern over the impacts on aquatic organisms resulting from the operation of the existing OCNGS once-through cooling system. To operate the station, AmerGen must comply with the Clean Water Act and associated requirements imposed by the State as part of its NJPDES permitting system. OCNGS cannot operate without a valid NJPDES permit. On July 19, 2005, the New Jersey Department of Environmental Protection (NJDEP) issued for comment a draft NJPDES permit for OCNGS. The draft permit affords AmerGen two options for demonstrating compliance with the EPA's Phase II regulations found at Title 10, Part 125, Section 125.94(a), of the Code of Federal Regulations (40 CFR 125.94(a)) for the Clean Water Act, Section 316(b). One option is to reduce intake flow to a level commensurate with the use of a closed-cycle cooling system. The second option is to reduce impingement and entrainment mortality of all life stages of fish and shellfish to the EPA performance standards of 40 CFR 125.94b(1) and (2). The State also has suggested that wetlands restoration is one means of meeting the performance standards. The SEIS for license renewal at OCNGS will evaluate the effects of the existing once-through cooling system as well as the impacts of an alternative closed-cycle cooling system. These evaluations will address impacts related to impingement and entrainment of organisms, cold shock, radiological releases*

to the aquatic environment, the thermal plume, and other potential or actual impacts. Any impact on Federally protected species also will be addressed in the SEIS. The ongoing NJPDES permitting process will ultimately determine the compliance action taken by OCNGS to meet requirements of the Clean Water Act.

Comment: The NRC's Draft EIS should document the adverse cumulative impacts that are occurring to the bay's aquatic biota from thermal impacts (cold-water shock and heated water, as discussed below) and from entrapment or entrainment from passing through the circulation and dissipation pumps. Because the data discussed in the applicant's Environmental Report are dated, it is difficult to ascertain the present level of cumulative adverse impacts. In addition, the NRC must consider the cumulative effects on the bay's aquatic environment due to other actions such as mortality from recreational and commercial fishing. Without more relevant biological data on species use of the project area, the Service must conclude that cumulative impacts to the environment are more than minimal. Without meaningful biological data, the NRC's Draft EIS should also conclude that cumulative adverse impacts would continue to occur with the applicant's preferred alternative (license renewal), warranting substantial measures for compensatory mitigation. (OS-AJ-6)

Response: *The SEIS will include a discussion of the cumulative impacts of the cooling system at OCNGS.*

Comment: Earlier this afternoon, a man who is a former employee of the plant talked about the 1994 Versar report regarding Oyster Creek's water intake and discharge. I wanted to state for the record that that report has been discredited and if you take a close look at both what the DEP has said in public, in addition to the draft water permit for the plant, they clearly state that the best available technology is a closed-cycle cooling system that would again reduce the plant's intake and discharge by over 95 percent. (OS-Q-7)

Comment: Now a few minutes ago, the representative from NJPIRG [New Jersey Public Interest Research Group] made a statement that the Versar report has been discredited. Well, I wish she had stayed around because I would very much like to know how the Versar report was discredited. Who discredited it and where did they discredit it? It was a scientific report. It can't be discredited just by stating that it's discredited. So you can be assured that I will be sending her a letter to get that information, and I'll share with as many of you as I possibly can when I get it. I think the reason she would like it to be discredited is not only because of the conclusion that I just read to you, but they came up with some other significant conclusions regarding the impacts of Oyster Creek. (OS-T-3)

Response: *The comment refers to a report prepared by J.K. Summers et al. of Versar, Inc. entitled Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station dated May 1989. The report was prepared by Versar for the NJDEP to summarize the findings and*

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conclusions of Versar's review and evaluation of the OCNGS 316 (Section 316 of the Clean Water Act) demonstration and to make recommendations that would assist the NJDEP in making a Section 316 decision for the OCNGS. As part of the environmental review for the OCNGS license renewal application, the NRC staff will consider the Versar report and its findings.

Comment: When an agency is evaluating reasonable significant adverse effects on the human environment in an EIS, and information is incomplete or unavailable, the agency shall determine the reasonableness of including that information in an EIS (40 CFR Part 1502.22).

The Service recommends that the NRC postpone the issuance of its Draft EIS (June 2006) until additional ongoing biological studies (which began recently) are completed and information is available to assess plant operational effects on fish and wildlife resources. The results of these studies are essential for assessing potential adverse environmental impacts to the aquatic environment. The overall cost of obtaining this information is not exorbitant, as defined in 40 CFR Part 1502.22 (a) and is necessary to fulfill NEPA [National Environmental Policy Act of 1969] responsibilities to adequately assess individual and cumulative impacts (see cumulative effects discussion below). Information from the biological studies will yield, at a minimum, biomass losses of finfish and crustaceans from the applicant's plant operation and projected adverse impacts to the aquatic environment if the license is renewed.

The applicant's Environmental Report uses biological data derived from a 12-year period (1965 to 1977), to describe aquatic biota found in the project area; however, the age of the data (28 years) limits its value for assessing current and reasonably foreseeable future impacts. The applicant's assertion that the impacts of entrainment of fish and shellfish are "small" (page 4-9) cannot be supported adequately with data that are most likely outdated. In addition, the assertion that impacts are small appears to contradict later statements in the applicant's Environmental Report that numerous unavoidable adverse impacts to the aquatic environment are occurring (page 6-5).

The plant utilizes 1.25 billion gallons of water each day for cooling. Water from Barnegat Bay enters the Forked River, passes through several small, mesh screens and large circulating or dissipating pumps, is heated upwards of 24 degrees Fahrenheit as it passes through the heat dissipation chamber, and is then released into Oyster Creek, eventually flowing back into the bay. This cooling water entraps and entrains an unknown amount of aquatic biota, including egg, larvae, juvenile, and adult finfish and crustaceans. The NJDEP (2005) reported that the Forked River drainage area provides habitat for river herring. The same report indicated that the Upper Branch of the Forked River had a herring spawning run, which no longer exists due to the combined effects of pollution, habitat displacement, man-made water course blockages, and over-fishing. Although not mentioned in the NJDEP report, it appears that Oyster Creek, just south of the Forked River drainage area, may have also lost a herring spawning run after a dam was build on the creek in the 1960s for the purpose of storing water for fire fighting capability at

the nuclear plant. The proximity of the Forked River to the plant cooling intake structures makes it likely that any egg larvae or young-of-the-year herring originating from Forked River will pass through the plant's cooling system and be killed before entering Barnegat Bay.

Significant population changes have also occurred to several commercial and recreationally important finfish and shellfish species found in Barnegat Bay since the conclusion of the 12-year biological sampling study in 1977. The population of the hard clam (*Merceneria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*) have dropped precipitously and the localized effects of the intake of over 1 billion gallons of water per day on these two species are unknown. In addition, the Atlantic Coast population of the striped bass (*Marone saxitilis*) has risen sharply from the mid-1980s. Striped bass and other marine species are known to utilize the intake and discharge areas of the project, but the extent of their use is unknown. The economic value of recreational fishing in New Jersey is high (see discussion on public access and recreation below). The effect of the discharge of hot water is unknown on recreational sport fish and other aquatic species. In addition, there have been several confirmed large fish kills due to cold water shock from winter plant closings. The NRC Draft EIS should document these fish kills and discuss the cumulative impacts of these kills in view of the data and available information concerning the aquatic biota that is entrapped on the cooling water intake structures or entrained in the heat dissipation chamber.

Because of the concerns outlined above, the Service [U.S. Fish and Wildlife Service] recommends expansion of the current biological sampling study to a minimum of 3 years. A 3-year study would allow the NRC to more adequately determine what effects, if any, the plant's operation is having on aquatic biota. Obtaining this information does not appear to be cost prohibitive. The Service also recommends review of the current sampling method by the NJDEP, NMFS [National Marine Fisheries Service], Service, and other interested parties to ensure that information gathered will be adequate for assessing impacts to aquatic biota associated with plant operation. The Service also recommends collection of biological data for the life of the license in order to demonstrate that adverse impacts remain minimal over time. The license should contain conditions to require additional mitigation (see the discussion of mitigation below) should post-license data analysis confirm that additional or unforeseen adverse impacts are occurring. (OS-AJ-7)

Response: *The NRC staff recognizes that the amount and quality of data available for NEPA evaluations sometimes falls short of ideal, but believes that there is sufficient information available to perform an assessment of the impacts of license renewal at OCNGS. The assessment presented in the SEIS will be based on the best available information, drawing from a variety of sources, including data collected by AmerGen, the NJDEP, other governmental agencies, independent researchers, and others. If new and significant information becomes available in the future that demonstrates a significant impact on the aquatic environment as a result of continued station operation, the NRC staff expects the NJDEP to require modifications*

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to the cooling system necessary to protect the resource through the NJPDES permitting process.

Comment: The CEQ [Council on Environmental Quality] requires inclusion of means to mitigate adverse environmental impacts in the EIS discussion of environmental consequences, if not covered in the description of the proposed action or alternatives (40 CFR Part 1502.16[h]). In addition, a mitigation plan (when necessary) is generally required prior to project authorization by the NJDEP. Therefore, the Service recommends that the NRC develop a mitigation plan for the proposed license renewal and discuss the plan in the Draft EIS. The mitigation plan should be developed in consultation with the NMFS, Service, and NJDEP and identify proposed means to avoid, minimize, and compensate (in that order) all adverse environmental effects on fish and wildlife resources. Consistent with the Service's Mitigation Policy, all in-kind options should be exhausted before considering out-of-kind mitigation. For example, the Service is aware that the NJDEP is considering restoration of several large wetland areas as potential mitigation. Although the Service encourages wetland restoration in most cases, this should only be employed as out-of-kind mitigation after the applicant has exhausted other direct compensatory options for adverse impacts to aquatic organisms (i.e., the removal of fish blockages for river herring or the development of long-term hard clam or other finfish or shellfish restoration projects).

During the October 11-13 interagency scoping meeting, the Service learned that a dam and pond were constructed just below the headwaters of Oyster Creek to store water for fire fighting capability at the plant. From a review of pre-1969 construction aerial photographs of the pond, it appears that Oyster Creek was a functioning waterway capable of supporting fish passage and possibly spawning habitat. Oyster Creek has the potential to offset expected adverse impacts from the proposed license renewal via the construction of a fish ladder. The Service can assist the NRC in identifying other potential fish ladder projects as potential mitigation for the preferred alternative. (OS-AJ-9)

Response: *In Chapter 4 of the SEIS, the NRC staff will present an evaluation of the impacts of license renewal at OCNCS. If it is determined that the impacts of license renewal are not small (as defined in the footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B), the NRC staff will recommend mitigation to reduce the severity of those impacts. The installation of a fish ladder on the small onsite reservoir located on Oyster Creek was discussed with the licensee and will be addressed in the SEIS.*

A.1.3 Comments Concerning Terrestrial Ecology Issues

Comment: We are a staunch protector of the South Jersey wildlife and natural resources. We support the New Jersey Audubon Society. We've donated a significant amount of money to the organization in recognition for the society's efforts to help rescue and clean waterfowl impacted by the recent oil spills in the Delaware River. (OS-G-12, OS-G-26)

Comment: We also do bird surveys, and we do mammal surveys out at Oyster Creek. That information is given to the DEP, and it's compiled, and we work with the DEP if we need to. We also sponsor bluebird trails. Bluebirds are no longer threatened, but they were at one time, so 10 years ago we put up a bluebird trail and we monitor that to make sure that we were able to bring that population back, which we did, not singlehandedly but we had Ocean County put up bluebird trails. We have wood duck trails, and we have a peregrine falcon tower at the plant. (OS-O-4)

Response: *The comments are, in general, supportive of the licensee's current programs to protect terrestrial resources. No specific response is provided. The impacts of license renewal on terrestrial resources will be discussed in Chapter 4 of the SEIS.*

Comment: I remember when I first moved into my home in Sunrise Beach in Lacey Township, I took my brine tank from my saltwater conditioner and I threw it out on my driveway and some went on my grass. Well, I didn't realize that the salt would kill my grass. Well, the next morning, I woke up my whole lawn was dead. So I suggest don't ever put salt on any plant life. (OS-Z-5)

Response: *The comments are noted. The effects of salt drift from a cooling tower will be addressed in the alternatives section (Chapter 8) of the SEIS.*

Comment: The Service also recommends that the Draft EIS reflect that the Conectiv 230-kV transmission line is active. The applicant's Environmental Report on page 3-6 states that the line has not been constructed. (OS-AJ-4)

Response: *The SEIS will provide a description of the current status of the Conectiv transmission line.*

Comment: The applicant does not propose any new construction activities with the license renewal. However, during the inter-agency meetings noted above, the Service learned that a substantial amount of previously contaminated dredged material, stored in a confined disposal facility (CDF) just east of the plant on the Finninger's Farm property, may require remediation and/or removal to an approved upland facility. A site visit revealed that the farm consists of several abandoned fields; an early successional forest, including some maritime forest species; and pockets of both tidal and non-tidal wetlands. These -types of vegetative cover provide valuable habitats for upland wildlife species. New construction activities (e.g., clearing and grubbing of upland vegetation, upgrading roads, or the construction of an offloading barge facility in Oyster Creek) would be expected if the CDF requires remediation or removal and would impact terrestrial species that utilize the farm. Therefore, the Service recommends clarifying any activities proposed on the Finninger's Farm in the Draft EIS, including construction methods for any remediation of the CDF. (OS-AJ-8)

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Response: *The need for remediation of the dredge spoils pile on the Finninger Farm portion of the OCNGS site has not been determined. Should it be determined that remediation is necessary or desired, that action would be subject to a separate environmental review and is not a part of the license renewal process. The current status of the spoils pile will be discussed in the SEIS.*

Comment: The Service also recommends that, in association with implementing best management practices (BMPs), the NRC include provisions to control the spread of invasive species, such as *Phragmites australis* in the transmission line right-of-ways and the CDF on the Finninger's Farm.

A draft Management Plan by the Chesapeake Bay Program's *Phragmites australis* Working Group (2003) includes recommendations to curb the spread of *Phragmites* through federal and state permit conditions, in order to help achieve a long-term goal of no net gain in *Phragmites* acreage. The Service has subsequently recommended initiation of a similar planning effort to control *Phragmites* in the Hackensack Meadowlands in Bergen and Hudson Counties, pursuant to Executive Order 13122 and under the auspices of the National Invasive Species Council. The Service recommends a similar program in the project area, including the two power line right-of-ways maintained by Conectiv and FirstEnergy and the CDF, with participation of the NRC. In the interim, the Service recommends that any federal authorization resulting in wetland disturbance (e.g., power line right-of-way maintenance, dredging, or excavation of the CDF) include conditions requiring: (1) BMPs to prevent the introduction or spread of invasive species, such as avoiding creation of elevated berms and the spread or burial of *Phragmites* rhizomes; (2) 2 to 5 years of post-construction monitoring to detect the introduction or spread of invasive species, and (3) control efforts, if *Phragmites* or another invasive species are detected (to include re-grading or hydrologic corrections for any construction-related disturbances that promote the spread of *Phragmites*, if other control methods [i.e., herbicides] prove insufficient in the long-term). (OS-AJ-11)

Response: *At this time, there are no planned activities associated with license renewal that would result in the disturbance of wetlands on the OCNGS site or within the transmission line corridor associated with OCNGS. The assessment presented in the SEIS will include an evaluation of the vegetation-management protocols on the site and within associated transmission corridors. This assessment will address the effects of existing protocols on the spread of invasive species and will suggest mitigation if impacts are determined not to be small.*

A.1.4 Comments Concerning Threatened and Endangered Species

Comment: Our employees are trained to do their jobs with environmental protection in mind. One practice that we are particularly proud of is our commitment to protect sea turtles that become caught in our intakes. We have specific procedures in place for the safe return of all sea turtles to their natural environment. Our operators are trained to identify, to remove, and, if

need be, resuscitate those turtles. When a sea turtle is found, our operators contact the Brigantine Marine Mammal Stranding Center, which recovers the sea turtle, gives it a checkup, rehabilitates it if necessary, and releases it back to the sea. We also partner with Drexel University to track the number of sea turtles that are rescued from our intake canal. Oyster Creek has modified its intake structures to significantly reduce the impact on aquatic life. Fish and crabs caught in our intake screens are gently returned to the discharge canal, and we pump cool water from the intake canal to the discharge canal, diluting the warmer water coming out of the plant. (OS-G-10, OS-G-24)

Comment: We have a program that trains our operators to rescue sea turtles, and I think you heard about that earlier. When we're unsuccessful, it's generally because that sea turtle got to us injured. Boat propeller is the most frequent injury that we see. And, obviously, when it gets to us cut open from the boat propeller, it's hard to resuscitate them. (OS-J-4)

Comment: If there's a problem with an endangered species, for example, or a threatened species, such as an osprey or – we get seals, we get all kinds of terrapins – we stop work and take care of that animal, whether it's calling other regulatory agencies, if it's calling the DEP to come in and help us, that's what we do. (OS-O-6)

Response: *The comments are noted. They are, in general, supportive of the licensee's activities related to threatened and endangered species. No specific response is provided. The impacts of license renewal on threatened and endangered species will be presented in Chapter 4 of the SEIS.*

Comment: When Oyster Creek was found to be noncompliant with the turtle kills for their intake, speaking of environmental issues, they petitioned to have it increased – the amount that they could kill increased. This is not responsible to the community. This is not responsible to the environment. (OS-D-5)

Comment: Plant records indicate 32 impingement and 14 mortalities of endangered sea turtles since 1992. These data include the following species specific incidents:

5. 21 impinged Kemp's Ridley Sea Turtles with 9 mortalities.
6. 7 impinged Loggerhead Sea Turtles with 2 mortalities.
7. 4 impinged Green Sea Turtles with 1 mortality.

OCNGS exceeded their annual incidental take in 2004 when 8 juvenile Kemp's Ridley Sea Turtles were impinged and 3 were killed in the 3 month period from July 4 to September 23. An Incidental Take Assessment by the National Marine Fisheries authorized an annual limit of 4 Kemp's Ridley's (with no more than 3 mortalities), 5 Loggerheads (with no more than 2 mortalities) and 2 Green's (no more than 1 mortality). (OS-AH-3)

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Comment: AmerGen has submitted an application to the Nuclear Regulatory Commission (NRC) to continue operation of its Oyster Creek Nuclear Generating Station for an additional 20 years (the applicant's preferred alternative). The nuclear plant has been in operation since 1969, and its license is due to expire on April 9, 2009. On October 11 through 13, 2005, the Service attended several interagency scoping meetings with the applicant, the NRC, and representatives from the New Jersey Department of Environmental Protection (NJDEP) to discuss the project, current adverse impacts to fish and wildlife resources, and potential plant modifications and other mitigative measures that could offset these impacts. Currently, the power plant withdraws approximately 1.25 billion gallons of water per day from Barnegat Bay to aid in cooling the nuclear reactor. The intake of cooling water entrains and entraps an unknown quantity of aquatic biota from Barnegat Bay. Prior to the scoping meetings, the Service concluded with AmerGen on January 25, 2005 that the continued operation of the plant until 2029 would not adversely affect federally listed threatened and endangered species under Service jurisdiction.

As discussed in the Service's January 25, 2005 letter to AmerGen, except for an occasional transient bald eagle (*Haliaeetus leucocephalus*), no other federally listed or proposed threatened or endangered species under the Service jurisdiction are known to occur within the project area. Therefore, the Service concluded that the proposed project would not adversely affect federally listed species under Service jurisdiction.

Due to the recent nesting successes of bald eagles in New Jersey, a possibility exists that a pair of eagles could nest on or adjacent to the project area in New Jersey during the NRC's regulatory review or during the life of the renewed license (if approved). The NRC and AmerGen were notified at the above scoping meetings of the possibility of future eagle nesting. Should nesting occur in the project area during the NRC re-licensing process or during the life of any renewed license, additional consultation pursuant to Section 7 of the ESA [Endangered Species Act] would be necessary. We recommend that the NRC obtain a status update of the bald eagle prior to its approval of any license renewal.

The Service also recommended (not required) in its January 25 letter, that AmerGen retain a qualified botanist to conduct a survey to determine the presence of any rare plants, including the federally listed Knieskern's beaked-rush (*Rhynchospora knieskernii*) and swamp pink (*Helonias bullata*), and the federal candidate bog asphodel (*Narthecium americanum*) in the project area.

These species have been documented within 1.5, 2.8, and 1.3 miles (respectively) of the project area. Since re-licensing is not expected to impact project area wetlands, the Service recommended, rather than required, a botanical survey. To date, the Service is unaware of any botanical survey conducted in the project area. Surveys for the above species would be necessary if any project alternatives or mitigative measures were to involve project area wetlands that might support these species.

No further consultation pursuant to Section 7(a) (2) of the ESA is required with the Service at this time. If project plans change (e.g., to involve project area wetlands) or if new information is obtained that indicates the occurrence of a federally listed species at the proposed project site(s), this determination may be reconsidered. The Service provides the above determination with respect to federally listed or proposed threatened or endangered flora and fauna under the Service jurisdiction only. The proposed project is located on Barnegat Bay and may affect federally listed marine turtles. Principal responsibility for threatened and endangered marine species is vested with the National Marine Fisheries Service (NMFS). We understand that the NRC has begun formal Section 7 consultation with the NMFS. This consultation should be completed prior to the NRC's issuance of the Draft EIS. (OS-AJ-1)

Response: *The comments are noted. The comments relate to the impacts of OCNGS operations on threatened and endangered species and will be considered in the preparation of the SEIS.*

Comment: The Service recommends that the NRC and the applicant continue working with the NJDEP to protect State-listed species and to obtain any other recommendations to modify plant operations to protect resources of State concern. Any mitigation plans should be developed prior to completing the Draft EIS. In addition, any botanical surveys conducted in the project area should include State-listed species. (OS-AJ-2)

Response: *The comment is noted. The comment relates to the impacts of OCNGS operations on State-listed threatened and endangered species. The occurrence of State-listed species on the OCNGS site and associated transmission lines will be presented in Chapter 2 of the SEIS.*

A.1.5 Comments Concerning Air Quality Issues

Comment: They love to say that they don't produce fossil fuels, yet the material that they use, the fuel has to be mined. There's a tremendous amount of fossil fuels that are used in the production to get a plant running and to keep it running. (OS-D-6)

Comment: And stop – it is disingenuous for nuclear people to keep comparing the CO₂ [carbon dioxide] that comes from coal, as if that was the option we're all headed for. And in terms of the CO₂, they are saying that now nuclear is so – you know, that it's going to make our air in New Jersey better, and I said this at another meeting – there are three of the worst coal producers – coal-fed plants in the Midwest that have no safety equipment on them whatsoever in terms of getting the CO₂ out of their refuse there, that go to serve the uranium processing people. So that – and that CO₂ comes from Ohio and Kentucky, and wherever those plants are, right into New Jersey. So we don't need to keep saying that nuclear energy does not produce CO₂, because that's disingenuous. (OS-P-2)

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Comment: Oyster Creek provides a tremendous environmental benefit to the community. Oyster Creek represents 20 percent of JCP&L's [Jersey Central Power & Light Company's] electricity needs. Not only do we produce 9 percent of New Jersey's electricity, but we also do this with virtually no greenhouse emissions. Each year we operate Oyster Creek avoids some 7-1/2 million metric tons of carbon dioxide that would have been produced in coastal New Jersey by replacement of a coal plant. That replacement plant would produce carbon emissions equivalent to two million cars, nearly half of all the cars in New Jersey now. The clean air benefits of nuclear power production are of critical importance to New Jersey, the United States, and the world as we look for solutions to the greenhouse gas impacts. (OS-G-6, OS-G-20)

Comment: Oyster Creek, as a nuclear facility, is capable of producing power for over 6000 homes in New Jersey, day or night, wind or no wind, while it produces zero carbon emissions. In fact, we avoid the generation of carbon emissions equivalent to half the cars driven in New Jersey on a given day. (OS-J-2)

Comment: I am for it because of the simple reason that carbon emissions present more of a threat to human life on this planet right now, because of the fact of the amount that we're putting in. The United States puts 2.5 billion tons of carbon just from electric power generation through coal-fired plants. So if you really want to point a finger at what's causing environmental impacts, it's pointed to the coal industry, not to the nuclear regulatory area. (OS-B-6)

Comment: And when you look at, when it comes to diversifying in our fuel mix, because obviously we have to worry about the quality of air in New Jersey, we have predominant winds that blow from the west to the east. We have a lot of coal plants out there. Unfortunately, New Jersey's quality of air is pretty poor, which contributes to childhood diseases such as asthma. So my point being is we have five million cars too, also in the state of New Jersey. So how do we offset that? Well, Oyster Creek doesn't put off an effluent which really contributes positively to our environment. (OS-Z-2)

Response: *Nuclear power contributes substantially fewer carbon dioxide (CO₂) emissions to the atmosphere than fossil-fuel-based energy production methods. CO₂ emissions from various sources of energy will be discussed in the alternatives section (Chapter 8) of the SEIS.*

Comment: So as far as building a cooling tower, when you think about a cooling tower at Oyster Creek, personally, I don't think it's a viable issue. Environmentally, we don't even know the negative effect that a cooling tower could bring to Lacey Township, between all the salinity that pumps out of the stack. (OS-Z-4)

Comment: A cooling tower is a whole different issue around economic investment and whether or not it's the right thing to do. I know as a resident, I don't want a cooling tower. I'm going to

have salt spray all over my car and my house, and so on. That's enough for me or my neighbors. (OS-J-7)

Response: *The NRC staff will discuss the impacts associated with closed-cycle cooling, including cooling-tower drift, in the alternatives section (Chapter 8) of the SEIS.*

A.1.6 Comments Concerning Land-Use Issues

Comment: Federal law requires that licensees operating near the coast must adhere to State environmental rules. Oyster Creek does not, so, therefore, the plant should be shut down. (OS-I-5)

Response: *The NRC staff is unaware of any continuing noncompliance with State environmental regulations. The SEIS will address recent past compliance with State requirements.*

Comment: We've also donated land from our Finninger Farm property across the street from the power plant to Lacey Township for preservation. (OS-O-2)

Response: *The comment is noted. The comment does not relate to an impact on the environment, and, therefore, will not be evaluated in the SEIS.*

Comment: Recreational fishing is a \$35 billion industry for the nation, with approximately 900,000 New Jersey recreational anglers expending nearly \$700 million annually for fishing tackle and other related purchases (U.S. Fish and Wildlife Service and U.S. Census Bureau, 2002). A key component to these economic benefits is unimpeded public access. A federal excise tax is collected from manufacturers of fishing equipment, as well as a portion of the federal fuel tax that is attributed to motorboat usage. Revenue is passed on to participating states. Since 1950, the Service's Federal Aid in Sport Fish Restoration Program has provided funds to state fish and wildlife agencies. The funding is used to restore, conserve, manage, and enhance fish species that are sought by recreational anglers, fund educational programs to enhance the public's understanding of aquatic resources and recreational fishing, and to promote the development of responsible attitudes and ethics toward the aquatic environment.

Currently, recreational anglers fish in areas downstream of the hot water effluent in Oyster Creek. However, the public access points in this area are limited to the State Route 9 Bridge and several small shoreline areas. The Service recommends that the NRC work closely with the applicant, the NJDEP, and interested recreational fishing organizations to develop a comprehensive public access plan that would better address the recreational needs in the project area. A recreational use and access plan would be consistent with public access policies and regulations (Coastal Zone Management Act of 1972 (86 Stat. 1280; 16 U.S.C. 1451-1464). The Service is available to assist in the development of a public access plan.

| (OS-AJ-10)

Response: *Although the NRC staff agrees with the U.S. Fish and Wildlife Service that development of a recreational use and access plan would likely benefit anglers and address recreational needs in the area, the requirement to develop such a plan is outside the scope of the NEPA-mandated environmental review for license renewal. The comment will not be evaluated further.*

A.1.7 Comments Concerning Human Health Issues

Comment: We are asked to renew the license for AmerGen, so that they can continue because they're a business. And I understand they want to continue, because they're a business, but we're a community, and we have an obligation to the community. I'm a health care provider in this community, and my obligation is to the children of this community. And this is the reason why I'm here. This is the reason why I spend my days off to come here, because if I'm working in a hospital, if I can save one person's life in a year, to me that's an incredible accomplishment. Shutting this plant down has the potential to save hundreds of thousands of lives in this community for generations and generations to come. This child here was not born at the time the Chernobyl accident happened. This child was born years later, and this is the legacy of nuclear power. This is what happens. This plant, on a daily basis, when everything is working fine, is releasing radiation into the environment. It's releasing it in particulate form. It's contamination that stays in the environment, and it's not like going and getting an X-ray at the doctor's office where you get zapped one time and then it's gone. This stuff goes into your body, it's built into your bones in the form of strontium-90, it goes in your muscle – and cesium-137. And the science has proven to show this. There's a condition called Chernobyl heart, which develops in children having so much cesium in their heart muscle that they actually develop birth defects. (OS-D-8)

Comment: And I certainly do not want my grandchildren or great-grandchildren to look anything like the picture that the gentleman showed earlier. (OS-K-6)

Comment: I hope this takes a full environmental review. I am sorry I missed your presentation and look forward to hearing more than that. But this needs to be broader than just whether fish die, which is something we clearly are concerned about. It needs to look at the environmental health of people who are affected in the communities as well. (OS-R-7)

Comment: So in addition to daily radioactive emissions, whether or not you consider the Tooth Fairy Study as part of it, I just want to make sure you're really taking a close look at daily emissions. And in addition to that, that's why we're talking about waste issues and security issues, it's because those fall under the general scope of radiation protection. (OS-Q-13)

Comment: The Chemistry Department samples, analyzes, and trends parameters for many of the plant systems. However, as I see it, there are three main reasons that we take the

thousands of samples that we do. The first is to protect the public. Almost 80 percent of Oyster Creek's employees live and raise their families in Ocean County. So for us, the public has names and faces. The public is our families, our friends, and our neighbors. There's nothing that we take more seriously than our obligation to protect those that we care about. (OS-AC-1)

Comment: Now there's about 100 or 105 of these plants around the country. None of them have been built since 1977 or so and they were all built in about a 10-year window there. So let's just say the average one is 30 years of age and there's about a 100 of them. That's 3000 operating years of nuclear power stations. And yet, all over the country there's not a single proven cluster of cancer, leukemia, birth defects, or anything else.

At that point in time, people should begin to look at this and say this is safe and clean. Your fears should be put aside. And also, I have to say that the NRC, it's not the same as talking to the IRS or the Department of Justice. The stakes are pretty high here. What is it that they're going to be paid off with for being corrupt? And it just doesn't make any sense. They have to breathe the same air we do. At a certain point in time this ought to be satisfied. I feel people are alarmed by this, they seem to worry about it day in and day out. And I abhor a lot of politicians who further these fears because it looks like they're fighting for their constituents. I'm standing up for this thing. I have no training in nuclear science, engineering. And I rely upon certain people that do have the training, as we all do throughout our lives. You go to a physician. He tells you that you need this pill or that pill. You're relying upon his training. I have expertise in certain areas and I expect people when they hire me to rely upon me in areas that I have expertise in. So of course, we have to rely upon these people, and I don't believe that they have performed in any way that would bring any doubt upon their character or their ability and I hope that you people will, in fact, find some solace in this and satisfaction that there just isn't anything to base this on. (OS-Y-2)

Response: *The comments are noted. The assessment of human health impacts in the SEIS will determine if the facility is currently limiting and will continue to limit radiological releases to within Federal limits, which are considered protective of the public. Absent new and significant information that would lead the NRC staff to conclude that future operation would result in routine radiological releases in excess of the Federal limits, the NRC staff will not evaluate the effects of low-level ionizing radiation on members of the public. The NRC staff concluded generically in the GEIS that "the significance of radiation exposures to the public attributed to the operation after license renewal would be small." The comments provide no new and significant information and, therefore, will not be evaluated further.*

Comment: In 1976, I was teaching school with another teacher and the area around the plant had to go for tests within a mile and a half. They were being treated with leukemia and this was affecting people. In Vanderbilt and I questioned about it, you know, and everything, the teacher said that the plant was built in 1967 and at the time there was no regulatory data supporting when the plant was built or any type of data regarding requirements, etcetera.

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When I started doing the research on it at the time, the plant was supposed to come up for renewal and it kept on coming up for renewal, and I couldn't believe this and what happens is there's a loophole in the clause that grandfathers any previous data does not have to comply with the present data of what has to go into the plant. And when I heard this, you know, and everything, it was really questionable. So I started doing some research about it. And Vanderbilt University, the edu, says the RPHP [Radiation and Public Health Project] research associates from Vanderbilt did a study on it and they said that they had the four nuclear plants in New Jersey listed, and it said they've had considerable radioactivity to the local environment, raising the question of whether local residents have been harmed. And then it goes on with the study. And it says about the research group has investigated this issue as documented facts that suggest such harm is occurring. A number of these findings have been published in peer-reviewed medical journals. Radioactive emissions, the Oyster Creek reactor began operations on May 3, 1969 making it the oldest of the 103 U.S. reactors still in operation. Now this is – I got this off the web in 2001. So you know. The Salem and Hope Creek reactors – it goes on and on. And it says "Oyster Creek emitted 77.0 curies of airborne radioactivity in the period from 1970 to 1993, the largest amount of any U.S. reactors."

And it keeps on going. And it talks about the similarity of the average concentration of radioactive strontium-90 in 222 New Jersey baby teeth is relatively constant after 1980 and then it keeps on going down and it says "Ocean and Monmouth County children, under age 5, is 32.4 percent greater than the U.S. rate and 30.6 percent greater than any other New Jersey counties. Ocean and Monmouth lie directly downwind of the Oyster Creek reactor."

And then it keeps on going down and it says "Cancer mortality in Ocean and Monmouth County children under age 10 was 43.9 percent since the early 1980s, compared to the decline, 35.3 percent and 23.4 percent in the nation and the rest of New Jersey."

And then it keeps on going down about the different kinds of cancers, leukemia, Hodgkin's disease and non-Hodgkin's lymphoma, and multiple myeloma.

And the report keeps on going on and I'm sure if you want to contact the university or whatever, Vanderbilt will still have the report on file and this by the Ph.D. Jay M. Gould, Ph.D., Director; Ernest J. Sternglass, Ph.D., two scientists; Jerry Brown, Ph.D.; Joseph Mangano, MPH, MBA; William McDonnell, MA; Marsha Marks and so on. (OS-AF-1)

Response: *The NRC staff acknowledges that past radiological emissions from OCNGS, particularly in the 1970s, were significantly higher than current levels. The NRC staff's analysis is focused on impacts occurring during the license renewal period. The NRC staff concluded generically in the GEIS that "the significance of radiation exposure to the public attributable to the operation after license renewal would be small." Absent new and significant information that would lead the NRC staff to conclude that future operations during the license renewal period would result in routine radiological releases in excess of Federal limits, the NRC staff will not*

evaluate the effects of past releases of low-level ionizing radiation on the public. The comment provides no new and significant information and, therefore, will not be evaluated further.

Comment: My question is, I understand in our previous conversation, that you will be relying on existing studies. Will the Tooth Fairy be part of that review or is any kind of radiation exposure currently part of the environmental review for the plant? (unidentified speaker)

Response: *In 2000, a report entitled Strontium-90 in Deciduous Teeth as a Factor in Early Childhood Cancer was published by the Radiation and Public Health Project. The report alleges that there has been an increase in cancer incidence due to strontium-90 released from nuclear power facilities. Elevated levels of strontium-90 in deciduous (baby) teeth were claimed in the report as evidence for the increase in childhood cancer. This study has been largely discredited by the scientific community for a number of reasons, including lack of controls, small sample sizes, and the lack of environmental sampling and analysis (see <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tooth-fairy.html>). The assessment of human health impacts in the SEIS will determine if the facility is currently limiting and will continue to limit radiological releases to within Federal limits, which are considered protective of the public. The comment provides no new and significant information and, therefore, will not be evaluated further.*

A.1.8 Comments Concerning Socioeconomic Issues

Comment: In addition, Oyster Creek employees are community-minded and generous. Oyster Creek has the largest employee-run United Way campaign in Ocean County. This past year our employees raised more than \$180,000 for the United Way. Our employees are involved in the American Red Cross, Juvenile Diabetes Research Foundation, and the American Cancer Society. They are Little League coaches, Girl and Boy Scout leaders, volunteer EMTs and firefighters, and PTA members. We support a variety of family and youth organizations and activities in local communities, and have donated to – land to the community for recreational use. (OS-G-5, OS-G-19)

Comment: Our employees are also involved in many environmental activities in the area, including the World Series of Birding, aiding the Cape May Observatory, and Ocean Nature and Conservation Society, and also the Barnegat Bay Estuary. (OS-G-13, OS-G-27)

Comment: Oyster Creek has donated thousands of dollars to the New Jersey Audubon. (OS-O-1)

Comment: Oyster Creek also supports me and two other members to be on the World Series of Birding every year, which is quite expensive. It's \$2000 just to sponsor us to go out and bird, and find all the endangered and threatened species around Ocean County and the state of New Jersey. (OS-O-3)

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Response: *The comments are noted. The comments relate to socioeconomic issues and, in general, are supportive of license renewal for OCNGS. The comments provide no new and significant information, and, therefore, will not be evaluated further.*

Comment: Additionally, there are several environmental aspects of this plant, as Suzanne Leta went on, about the cooling towers. We also support only the option of installing cooling towers at this plant and oppose the mitigation factor of wetlands restoration. Tourism is the third largest industry in the state of New Jersey, and Barnegat Bay heavily contributes to that. We need to be looking at what those factors are in determining what the harm is on Barnegat Bay by this plant, and how that's negatively impacting not just the environment but also the economy of the state of New Jersey in terms of the degradation that this plant causes to that important estuary. (OS-R-3)

Response: *The commenter expressed concern that continued operation of OCNGS during the license renewal period may adversely affect Barnegat Bay, which supports a large recreational tourism industry in the State. The NJDEP has the responsibility of implementing the provisions of the Clean Water Act with respect to OCNGS continued operation. The NRC staff is confident that the NJPDES permit issued by the State will adequately protect Barnegat Bay. The comment provides no new and significant information and, therefore, will not be evaluated further.*

Comment: More than 450 families, not including our security personnel, depend on our plant for their livelihood. Of these 450 employees, approximately 250 are members of the International Brotherhood of Electrical Workers, Local 1289. These are good, high-paying jobs with excellent benefits. Our employees are highly skilled and dedicated, and I'm proud to work with them. When I first came to Oyster Creek, a local resident told me, "Run Oyster Creek safely. Do a good job, and, most importantly, keep that plant open, because a lot of my neighbors work there." (OS-G-2, OS-G-16)

Comment: Oyster Creek strengthens our community in so many ways. We are a significant employer and a public – and a positive economic force in the local area. The operation of Oyster Creek adds \$52 million to Ocean County. We spend \$7.7 million on goods in Ocean County and pay \$9.2 million in sales and local taxes every year. We contribute \$234 million to Ocean County's domestic product annually, if we value the electrical production that's considered. And we have led the way to \$33 million in increased output in Ocean County and \$46-1/2 million more in economic output in New Jersey itself every year. (OS-G-4, OS-G-18)

Comment: So what I'm saying here is I don't want to hear that we've got to have this power plant, it's safe and it's good and it's producing a lot of jobs, because the people of Lacey Township are not going to see any difference in their tax structure if that thing closed tomorrow. The reason for that is because the tax law was passed many, many years ago that said if

Oyster Creek closes, it does not have an impact on the taxes of Lacey. Let's close it, and let's get it done now. (OS-C-7)

Comment: In addition to that, I took a look at what you do review in terms of the general scoping. The first is you look at, it's called socioeconomic and environmental justice and that is a really, I think a very important part of thinking about environmental health and public health and so I know you look at the evacuation plan annually which I understand. Unfortunately, it does not look at the plan 20 years out and so when you're thinking about socioeconomic and environmental justice you must consider what the population is going to look like 20 years down the line because there are excellent estimates that the census has and if you looked and talked to the towns, that information is available and it will change and it is changing right now. (OS-Q-11)

Comment: However, the other thing you have to take into consideration is you're also going to be probably getting rid of \$52 million worth of revenue for Ocean County and it may even cost more. Because if you're hooked up, those houses that are receiving that energy from Oyster Creek, if they get hooked onto the power grid, then they're going to be paying more money for that energy, even if they seem to think it's more environmentally sound. But that's not – that might be a Tooth Fairy issue, actually. Not only will we be paying more for that energy, you probably – it might actually depress the economy a little bit because then there's all these other service industries that are connected to all that. It's something to keep in mind. (OS-X-2)

Response: *The comments are noted and will be considered in the preparation of the SEIS.*

A.1.9 Comments Concerning Alternate Energy Sources

Comment: And I have a question for AmerGen. In 10 years, let's say this plant did become unsafe to operate, I'm sure that they would start taking steps into shutting it down. Now my question to AmerGen would be and you've seen the advertisements on the TV, this new power plant company that's floating around, I believe they're out of Canada, and they're advocating new nuclear power plants. Would AmerGen consider building another plant on that site? I for one would be in favor of it. And I believe that is the future. Coal, fossil fuels, they're not going to last us. Look at what happened with Katrina. The pipelines shut down for a couple of days. Gas went up from \$1.90 a gallon to \$3 and something a gallon. We can't live with that forever. But nuclear power plants is – maybe not the total solution, but it's the answer today until something else comes along. (OS-U-4)

Response: *Chapter 8 (alternatives) in the SEIS will discuss the relative impacts of alternatives on license renewal, including the impacts of replacing OCNCS generation with a new nuclear facility.*

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Comment: When you look at other alternative energies, in the case of wind, solar, and conservation, they can easily make up for it. A gentleman before asked about why Germany had switched. Germany has switched because of safety concerns and because Europe is finding that alternative energies are actually filling the gap. The technology has come of age, and it is working. (OS-D-7)

Comment: Now, we get to this person that was talking about the reactor. It's clean, it's safe, but no carbon. But you've got 3 percent energy and 90 percent waste, nuclear waste, which is worse. What they should be doing is cutting down on some of the – you know, some of the energy we use. (OS-E-5)

Comment: We also took a look at part of our review and alternatives if Oyster Creek would not have its license renewed and another source of electric generation would have to be installed either here onsite or someplace else to generate 600 megawatts of electricity, and concluded that any other means of generating 600 megawatts would have more of an impact on the environment than continued operation of Oyster Creek. I think one thing we need to keep in mind, though, here is that whatever we do, whether it's generating electricity, driving a car, building a new home, building a new industry, a new plant someplace for people to work, it all has impacts on the environment. And our charge in this is to make sure that we are assessing that and minimizing the impact on the environment to take all of that into consideration. We did that in our review, and we concluded that the impact on the environment of continuing to operate Oyster Creek is the best alternative for continued generation of 600 megawatts. (OS-H-4, OS-H-9)

Comment: That nuclear power – any nuclear power is outdated technology. It's finished. Wind and solar are the new modern technologies. They are clean, they are safe, they are not going to hurt us, even if something goes wrong. The plant has lived out its 40-year life span. Now is the time to let it die. (OS-S-2)

Comment: Then in the future there are definitely ways that we can replace the plant with clean and safe and non-air-pollution-emitting energy generation. The primary source of that is energy conservation and efficiency. I want to give one primary example and that example is an Appliance Efficiency Standards Act that was actually passed this summer, and that act actually puts eight energy-efficient appliances into the market in New Jersey and it actually saves about 300 megawatts of electricity by 2010 across the state. That's about half of what Oyster Creek provides and that's eight appliances only. So I want to make sure that when we're talking about – I know that in this environmental review, part of the review is to take a look at what happens if this plant is not, if the license is not extended and I want to make sure that part of that scope is to look at other clean and renewable alternatives to Oyster Creek because I think that is a critical part that may be missing, unfortunately. (OS-Q-10)

Comment: So I'm just saying to everybody, there are alternatives coming up. At the present time, dark matter is being researched, dark energy. It still has not been containable though yet. So I'm saying to everybody there is future yes. (OS-AF-2)

Response: *The comments are noted. The comments relate to alternative energy development and conservation. Alternatives will be considered in Chapter 8 (alternatives) of the SEIS; they include conservation (demand-side management) and renewable energy sources such as wind and solar energy.*

A.1.10 Comments Concerning Postulated Accidents

Comment: And what we're talking about here is if there is a problem with that plant, and we get a very significant release of radiation, and the consequences of that radiation are Chernobyl children. These are the children of Chernobyl. These are not statistics. These are people's children. If an accident happens at Oyster Creek, these are going to be the children of our community. These are going to be the children of our community for generations to come.

I also have another picture here. This is the Davis-Besse reactor that was being inspected regularly by the NRC and by the licensee in Ohio. As anybody can see looking at this picture, severe corrosion is occurring on this. However, they didn't seem to think this was a problem and allowed the plant to continue to operate. This is a plant is now old at Oyster Creek. So I think you can understand why the community here has quite a few reservations about the inspection that's going on right now at Oyster Creek. With that said, I'd like to go back to the original question that I asked at the first meeting. And considering how much – the length of time it's been since then, and nobody has gotten back to me about this question, I would hope that you would have the information to answer this question now, because this is not a question that has come to you out of the blue. This is a question that was asked before, and I was told that I would be given an answer.

The question I have is that on March 1st, after restoring the main transformer and restoring the main generator to service at Oyster Creek, a power ascension was in progress when an error resulted in the loss of multiple reactor recirculation pumps, which led an operator to manually scram the reactor. I'd like to add that this was not done very well. It was not controlled well. The water level was not controlled well, and as you go on later in this report that was the conclusion of the NRC inspector. It was also noted that the plant had been overpressurized. And one of the specific questions that I was asking was how many times – from documentation that I've read, it was overpressurized 10 times, the actual reactor vessel. I was asking how many times it had actually been overpressurized, so I was hoping somebody had an answer to that question for me. (OS-D-1)

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Response: *The environmental review does consider postulated plant accidents that might occur at OCNGS during the license renewal term. As a result, the impacts of accidents are considered within the scope of the environmental review for license renewal and will be addressed in the SEIS.*

With respect to a Chernobyl-type accident at a U.S. nuclear power plant, U.S. reactors have different plant designs, larger shutdown margins, robust containment structures, and operational controls to protect them against the combination of errors that led to the accident at Chernobyl. Although the NRC has always acknowledged the possibility of major accidents, its regulatory requirements provide adequate protection, subject to continuing vigilance, including review of new information that may suggest weaknesses. Assessments in light of Chernobyl have indicated that the causes of the accident have been adequately dealt with in the design of U.S. commercial reactors. A Chernobyl-like accident is outside the scope of license renewal for U.S. commercial reactors and will not be evaluated in the SEIS.

The reactor vessel head corrosion event at the Davis-Besse Nuclear Plant is an operational issue and is also outside the scope of license renewal. The event has had, and continues to have, a significant effect on both the NRC and reactor licensees. The corrosion was discovered by the licensee during an NRC-required inspection resulting from safety concerns related to reactor vessel head nozzle circumferential cracking. Since the discovery of the reactor vessel head corrosion event at Davis-Besse, the NRC has significantly increased the oversight of licensee reactor vessel head activities and other activities that may affect the condition of the reactor vessel head. Almost immediately after the discovery, the NRC strengthened reactor vessel head inspections with the imposition of inspection requirements by order. The immediate initiatives by the NRC staff provide assurance that any further corrosion events will be identified early and corrected. The NRC also formed a Lessons Learned Task Force (LLTF) to carefully review the Davis-Besse incident and make recommendations for improvement. The LLTF has made recommendations for improvements in reactor vessel inspection requirements, inspection program management and inspector qualification, handling of operating experience information, and research activities relating to leakage detection methodologies. The NRC is confident that the implementation of the LLTF recommendations will preclude any future recurrence of reactor vessel head corrosion similar to that at Davis-Besse.

Reactor overpressurization events are also outside the scope of the environmental review for license renewal. The event referred to at OCNGS actually involved an excessive reactor cooldown that occurred following an automatic reactor scram due to a low water level condition on November 15, 2000. During scram recovery, the reactor experienced an initial cooldown rate of 111 degrees (Fahrenheit) per hour, which exceeded the technical specification (TS) limit of 100 degrees per hour. The TS bases consider 10 cooldowns exceeding 300 degrees per hour to be acceptable during the lifetime of the facility to ensure calculation assumptions used to determine reactor vessel component fatigue limits. AmerGen's records indicate that OCNGS has no occurrences of cooldowns exceeding the 300 degrees per hour limit. OCNGS has

exceeded the 100 degree cooldown rate twice in the plant's history, on December 29, 1972, and again on November 15, 2000. The comment will not be evaluated further.

Comment: And the second question that I had is they put out this report to talk about normal boiler loss of approximately three-quarters of a gallon per minute. Now, my question is: if you've got a reactor that's leaking, and it's considered a normal part of its operation, releasing three-quarters of a gallon per minute, where is this water going? What kind of corrosion is it producing? How is this realistically being monitored? And not just with visual inspections.

As we can see from Davis-Besse, it didn't work, because that reactor was so corroded through it was basically an act of God that kept it from going critical. How is this corrosion being monitored effectively? And not just with visual inspections, but actual testing of materials.

And also, where is this water going? Where is this being admitted? Where is this radiation going? I mean, I know it's part of normal operation of a nuclear reactor to be releasing radioactivity into the environment, and I'm concerned that this is not being properly monitored and checked. (OS-D-2)

Response: *Leakage from the reactor coolant system is an operational issue and is outside the scope of license renewal. The leakage rate from the reactor coolant system is limited by a TS to 5 gallons per minute (gpm) for "unidentified" leakage and 20 gpm for "identified" leakage. The allowed leakage rates are based on the predicted and experimentally observed behavior of cracks in pipes and on the ability to make up coolant system leakage in the event of a loss of offsite power.*

The dry-well floor drain sump and equipment drain tank provide the primary means of leak detection and collection. Identified leakage is that from valves and pumps in the reactor system and from reactor vessel head flange gasket. Leakage through seals of this equipment is piped to the dry-well equipment drain tank. Leakage from other sources is classified as unidentified leakage and is collected in the dry-well sump.

Reactor coolant system leakage is continuously monitored and is trended to ensure that unidentified leakage is identified, analyzed, and corrected in a timely manner. The amount of leakage is determined by recording the amount of liquid pumped out of the dry-well equipment drain tank and the dry-well sump. This liquid waste is sent to the radioactive waste processing system where it is filtered and recycled for use as makeup water for the plant. Any release to the environment would be monitored and included in the Annual Radioactive Effluent Release Report. The comment will not be evaluated further.

Comment: Actually, I'd like to start by clarifying a couple of things. The first thing I was clarifying is the gentleman stated before that there are no Chernobyl-style plants operating in the United States. Although this is true with the graphite reactor, the one that they were

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operating was closed down. The point is not the type of reactor. The point is the type of accident that can come from it, and that type of accident is a massive radiation release. And these are the – this is what is going to cause a Chernobyl-like incident. It's not necessarily a fire, but if Oyster Creek – because of its age, does have a catastrophic release of radiation, the plant in Chernobyl is only two years old. Oyster Creek has far more radiation there. So even a significant percentage of that would be catastrophic to the environment. (OS-D-3)

Comment: I think when we talk about environmental effects, the big environmental effect that scares me, and should scare all of us, is what happens if it really goes wrong. And it worries me terribly that we're taking an old, obsolete plant and saying, "Let's put 20 more years on it." (OS-K-3)

Response: *The environmental review does consider postulated plant accidents that might occur during the license renewal term. It also includes a review of the alternatives to mitigate severe accidents if this has not previously been evaluated for the applicant's plant. The purpose of this consideration is to ensure that plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance are identified, evaluated, and, if appropriate, implemented. As a result, the impacts of accidents are considered within the scope of the environmental review for license renewal and will be addressed in the SEIS.*

Comment: How does that accident mitigation – how does that play into the environmental scoping process? (OS-Q-5)

Response: *An analysis of severe accident mitigation alternatives (SAMAs) is included as part of the environmental review of the application for license renewal if it had not been considered earlier for the facility. The SAMA review is an evaluation of alternatives to mitigate severe accidents. Severe accidents are those that could result in substantial damage to the reactor core, whether or not there are serious offsite consequences. The NRC staff reviews and evaluates SAMAs to ensure that changes that could improve severe accident safety performance are identified and evaluated. Potential improvements could include hardware modifications, changes to procedures, and changes to the training program.*

In some cases, SAMAs may have already been evaluated by the NRC staff in a previous EIS, supplement, or environmental assessment (EA) written for a facility before the applicant applied for license renewal. In such cases, the evaluation does not have to be repeated for that particular facility, according to NRC regulations in 10 CFR 51.53. However, if the NRC staff has not previously evaluated SAMAs for an applicant's plant in an EIS, a supplement, or an EA, the license renewal applicant is required to consider alternatives to mitigate severe accidents as part of the license renewal application. AmerGen has submitted a SAMA evaluation for OCNCS as part of its license renewal application.

The outcome of the SAMA analysis is a list of plant improvements that meet the criteria of being cost-beneficial, provide a significant reduction in total risk, and are associated with aging effects during the period of extended operation.

In some cases, however, the review leads to a determination that there are no specific SAMA candidates that are cost-beneficial. This may be the case where there is a low residual level of risk and where the applicant has, in fact, already implemented many plant improvements. In other cases, a SAMA that is potentially cost-beneficial may not relate to adequately managing the effects of aging during the period of extended operation. Such SAMAs need not be implemented as part of the license renewal pursuant to 10 CFR Part 54.

A.1.11 Comments Concerning Uranium Fuel Cycle and Waste Management

Comment: The second question is: what are the requirements of nuclear regulatory as far as encasing the spent fuel rods? Are there specific things at Yucca Mountain that they are required to do, which is we can't – and I understand a lot of the points of spent fuel rods is not in – is the transportation of those to Yucca Mountain. What are the regulations for encasement? (OS-B-2)

Response: *Requirements for dry cask storage and transportation are outside the scope of license renewal. During dry cask storage and transportation, spent nuclear fuel must be "encased" in NRC-approved casks. An NRC-approved cask is one that has undergone a technical review of its safety aspects and been found to meet all of the NRC's requirements. These requirements are specified in 10 CFR Part 72 for storage casks and 10 CFR Part 71 for transportation casks. Regulations that govern disposal of high-level radioactive waste in a potential geologic repository at Yucca Mountain, Nevada, are provided in 10 CFR Part 63. The comment provides no new and significant information and, therefore, will not be evaluated further.*

Comment: I'd like to know how many spent fuel rods are now stored onsite, and how many are we generating in a yearly process? (unidentified speaker)

Response: *Although outside the scope of license renewal, at the time of the scoping meetings, there were 976 spent fuel assemblies loaded in 16 dry storage casks at the OCNGS site, and 1992 assemblies stored in the spent fuel pool. OCNGS is on a 24-month refueling cycle, with about 180 spent fuel assemblies discharged to the pool during each refueling. Each assembly weighs approximately 600 lb, and of that weight about 500 lb is actual uranium fuel.*

Comment: Presently, there is no permanent safe storage of nuclear waste, so rather than continue to produce this toxic by-product, the plant should be shut down. (OS-I-3)

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Comment: Furthermore, please add to the record that the Federal Government should not subsidize the new construction of nuclear plants until the problem of safe storage of nuclear waste is solved, an issue not covered by the new energy bill passed by the Congress. (OS-I-8)

Comment: The particular concern – and this is not just here in this area, but having read about it in the newspapers – is our utter and complete failure after all of these years to come up with any solution, reasonable solution, to what to do with the rods that are left, the things that are so completely contaminated, so heavily contaminated. And we kept hearing – you know, I'm not young, so I've been hearing for years and years and years how they're going to solve this problem. Well, we're no closer to it now than we were 30, 40, 50 years ago. And what we are a lot closer to is all, and I mean all, those rods that are right up the road apiece. And so I am very frightened about those. We keep adding more and more to them with no – no – nothing in sight of getting rid of them. (OS-K-4)

Comment: Our number one problem is not radiation from the atomic power plant. It's how to get rid of – we have to get the Federal Government to start moving on disposal of the fuel rods. That is a major priority that's the Federal Government's responsibility that they should take on, not these people. (OS-B-4)

Comment: You can mount this under a fault, and those tanks will only hold highly radioactive radiation for 10,000 years, at most. So some of this radiation doesn't go away for billions of years. Then, you've got the radiation, you've got the – it's really hot stuff, this radiation. If they ever lose water from it – I'm telling you what is going to happen here. You know this. You know it, and you speak it, because you're dealing with a genocide. You don't understand. (OS-E-1)

Comment: Our biggest concern right now is that the NRC refuses to look at the solid waste problem and the evacuation problem as a legitimate concern within the scoping process. They keep saying that that's an everyday issue. We say that's an everyday issue that every day they don't take care of. So, therefore, it's a now issue, yes, but it's an ongoing issue that isn't being taken care of.

In terms of the nuclear waste, if anything should be considered in an environmental scoping meeting, it's that waste that is not being disposed of, that is dangerous as it sits there now. Even going to the casks, the cement casks, no one really knows how those will hold up. There is talk that 300 years they will probably start leaking.

In terms of Yucca Mountain, even if they ever do open that up, which it looks like they won't, there will be so much nuclear waste at all of the plants that we don't even know if ours will get there. A nuclear waste dump in New Jersey, which is what we're talking about, is what will happen – it is that way now, and it will continue to get worse the more we make. How can an industry claim to be moral and community-oriented when they produce a deadly substance where there is no known disposal for anywhere on this earth? No one can find it.

Somebody asked the reason that Germany is getting off nuclear, or wants to get off nuclear, as the U.K. would like to, too, since they had that terrible accident at the nuclear processing plant. The reason they're getting off it is because there is no place to dispose of this stuff. They are finding out that renewable energy is getting cheaper and cheaper, when you consider the billions of dollars that go into subsidizing the nuclear energy field. (OS-P-1)

Comment: I think there are clear problems involved with the way that the NRC looks at license extensions, and, number one, they don't take a look at waste. You think of it as an ongoing issue. But there's going to be 20 more years of it. And looking that far into the future, unfortunately, is not part of that process. (OS-Q-3)

Comment: And when they get to Yucca Mountain, they put the high, long-lived radiation, they put that in Yucca Mountain in carbon steel – in tanks that last 10,000 years, they say. And then, they say it could deteriorate in 300 years, and it doesn't go away. So you keep on putting more fuel rods there, more radiation. Where are you going to put it? As soon as they go there, if they go there – they probably will – they have to already make a – already did make plans with the Indian reservations there to put it in the land there. Radiation doesn't go away. It decays. It has to decay to go away into another element, and some of that could be short-lived, some of that could be billions of years. And you're going to be sick, and your children are going to be sick. (OS-E-3)

Comment: I wanted to ask about two things and because when I spoke in July, August, I'm sorry, the months are going into each other, there was a concern for me about the spent fuel rods. And at that particular meeting the NRC said that they felt that the – based upon what was happening with Yucca Mountain that these rods could stay where they were. I want to know what is the Federal plan or the NRC's plan and how is it justified that more of these fuel rods can be generated when the existing rods are still there and with the burgeoning population and all of these other things, we don't have a plan. And do you have a foreseeable plan? Do you have an idea how many years the rods that are already there going to be there and generating more. What's that going to create in terms of what I would have a real concern about? (OS-AA-2)

Comment: How can they use Yucca Mountain when Nevada doesn't want those – if they don't want –. (unidentified speaker)

Response: *The safety and environmental effects of long-term storage of spent fuel onsite have been evaluated by the NRC, and as set forth in the Waste Confidence Rule (Federal Register, Volume 40, page 34658 [49 FR 34658], 55 FR 38474, and 64 FR 68005), the NRC generically determined that such storage could be accomplished without significant environmental impact. In the Waste Confidence Rule, the Commission determined that spent fuel can be stored onsite for at least 30 years beyond the licensed operating life, which may include the term of a renewed license. At or before the end of that period, the fuel would be moved to a permanent*

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repository. The GEIS is based upon the assumption that storage of the spent fuel onsite is not permanent. The SEIS regarding license renewal for OCNGS will be based on the same assumption.

The Commission has determined that the comprehensive regulatory controls that are in place and the low public doses that have been incurred ensure that the radiological impacts on the environment will remain small during the term of a renewed license. The Commission also concluded that there is reasonable assurance that sufficient low-level waste disposal capacity will be available when needed for facilities during the license renewal period as well as during decommissioning. The comments provide no new information and, therefore, will not be evaluated further.

Part II – Comments Received on the Draft SEIS

Pursuant to 10 CFR Part 51, the NRC staff transmitted the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Oyster Creek Nuclear Generating Station, Draft Report for Comment* (NUREG-1437, Supplement 28, referred to as the draft Supplemental Environmental Impact Statement [SEIS]) to Federal, State, and local government agencies; certain Indian tribes; and interested members of the public. As part of the process to solicit public comments on the draft SEIS, the NRC staff:

- Placed a copy of the draft SEIS into the NRC's Public Electronic Reading Room, its license renewal website, and at the Lacey Township Public Library;
- Sent copies of the draft SEIS to the applicant; members of the public who requested copies; representatives of certain Indian tribes; and certain Federal, State, and local agencies;
- Published a Notice of Availability of the draft SEIS in the *Federal Register* on June 16, 2006 (71 FR 34969);
- Issued public announcements, such as advertisements in local newspapers and postings in public places, of the availability of the draft SEIS;
- Announced and held two public meetings at the Toms River Quality Inn in Toms River, New Jersey, on July 12, 2006, to describe the results of the environmental review and answer related questions;
- Issued public service announcements and press releases announcing the issuance of the draft SEIS, the public meetings, and instructions on how to comment on the draft SEIS; and

- Established an e-mail address to receive comments on the draft SEIS through the Internet.

During the comment period, the NRC staff received a total of 27 comment letters in addition to the comments received during the public meetings.

The NRC staff has reviewed the public meeting transcripts and the 27 comment letters that are part of the docket file for the application, all of which are available in the NRC's Public Document Room. Appendix A, Part II, Section A.2, contains a summary of the comments and the NRC staff's responses. Related issues are grouped together. Appendix A, Part II, Section A.3, contains references cited in the NRC staff's responses. Appendix A, Part II, Section A.4, contains excerpts of the July 12, 2006, public meeting transcripts, and Section A.5 contains the comment letters.

Each comment identified by the NRC staff was assigned a specific alphanumeric identifier (marker). That identifier is typed in the margin at the beginning of the comment in each letter or transcript. The speakers at the meetings are listed in speaking order. Table A-2 gives the commenter's ID and affiliation (if stated) and the source of the comment (i.e., public meeting transcript or comment letter).

The NRC staff made a determination on each comment that it was one of the following:

- A comment that was actually a question and introduces no new information.
- A comment that was either related to support or opposition of license renewal in general (or specifically, OCNGS) or that makes a general statement about the licensing renewal process. It may make only a general statement regarding Category 1 and/or Category 2 issues. In addition, it provides no new information and does not pertain to 10 CFR Part 54.
- A comment about a Category 1 issue that provided new information that required evaluation during the review, or provided no new information.
- A comment about a Category 2 issue that provided information that required evaluation during the review, or provided no such information.
- A comment regarding alternatives to the proposed action.
- A comment that raised an environmental issue that was not addressed in the GEIS or the draft SEIS.

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- A comment outside the scope of license renewal (not related to 10 CFR Parts 51 or 54), including comments regarding the need for power.
- A comment on safety issues pertaining to 10 CFR Part 54.
- A comment that was editorial in nature.

Table A-2. Comments Received on the Draft SEIS

Comment ID	Commenter	Comment Source ^(a)	Page of Comment	Section(s) Where Addressed
A-1	Eugene Creamer	Afternoon Meeting Transcript	A-76	A.2.4
A-2	Eugene Creamer	Afternoon Meeting Transcript	A-76	A.2.4
A-3	Eugene Creamer	Afternoon Meeting Transcript	A-212	A.2.11
A-4	Eugene Creamer	Afternoon Meeting Transcript	A-77	A.2.4
A-5	Eugene Creamer	Afternoon Meeting Transcript	A-192	A.2.10
B-1	Isadoro Rubin	Afternoon Meeting Transcript	A-189	A.2.10
B-2	Isadoro Rubin	Afternoon Meeting Transcript	A-190	A.2.10
B-3	Isadoro Rubin	Afternoon Meeting Transcript	A-159	A.2.6
C-1	Tom Allison, Jr.	Afternoon Meeting Transcript	A-75	A.2.3
C-2	Tom Allison, Jr.	Afternoon Meeting Transcript	A-75	A.2.3
C-3	Tom Allison, Jr.	Afternoon Meeting Transcript	A-234	A.2.13
C-4	Tom Allison, Jr.	Afternoon Meeting Transcript	A-221	A.2.13
C-5	Tom Allison, Jr.	Afternoon Meeting Transcript	A-186	A.2.9
C-6	Tom Allison, Jr.	Afternoon Meeting Transcript	A-186	A.2.9
D-1	Joan Rubin	Afternoon Meeting Transcript	A-74	A.2.3
D-2	Joan Rubin	Afternoon Meeting Transcript	A-65	A.2.1
D-3	Joan Rubin	Afternoon Meeting Transcript	A-149	A.2.6
D-4	Joan Rubin	Afternoon Meeting Transcript	A-85	A.2.5
D-5	Joan Rubin	Afternoon Meeting Transcript	A-208	A.2.10
D-6	Joan Rubin	Afternoon Meeting Transcript	A-239	A.2.13
D-7	Joan Rubin	Afternoon Meeting Transcript	A-82	A.2.4
D-8	Joan Rubin	Afternoon Meeting Transcript	A-225	A.2.13
D-9	Joan Rubin	Afternoon Meeting Transcript	A-74	A.2.3
F-1	Joan Finn	Afternoon Meeting Transcript	A-234	A.2.13
F-2	Joan Finn	Afternoon Meeting Transcript	A-63	A.2.1
F-3	Joan Finn	Afternoon Meeting Transcript	A-234	A.2.13
F-4	Joan Finn	Afternoon Meeting Transcript	A-147	A.2.6
F-5	Joan Finn	Afternoon Meeting Transcript	A-239	A.2.13
F-6	Joan Finn	Afternoon Meeting Transcript	A-191	A.2.10
H-1	Tom Cervasio	Afternoon Meeting Transcript	A-225	A.2.13
H-2	Tom Cervasio	Afternoon Meeting Transcript	A-237	A.2.13

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
H-3	Tom Cervasio	Afternoon Meeting Transcript	A-221	A.2.13
H-4	Tom Cervasio	Afternoon Meeting Transcript	A-221	A.2.13
H-5	Tom Cervasio	Afternoon Meeting Transcript	A-226	A.2.13
H-6	Tom Cervasio	Afternoon Meeting Transcript	A-63	A.2.1
I-1	Michael Kennish	Afternoon Meeting Transcript	A-100	A.2.5
I-2	Michael Kennish	Afternoon Meeting Transcript	A-63	A.2.1
I-3	Michael Kennish	Afternoon Meeting Transcript	A-85	A.2.5
I-4	Michael Kennish	Afternoon Meeting Transcript	A-192	A.2.10
J-1	Barbara Bailine	Afternoon Meeting Transcript	A-82	A.2.4
J-2	Barbara Bailine	Afternoon Meeting Transcript	A-222	A.2.13
J-3	Barbara Bailine	Afternoon Meeting Transcript	A-75	A.2.3
K-1	Joseph Mangano	Afternoon Meeting Transcript	A-149	A.2.6
K-2	Joseph Mangano	Afternoon Meeting Transcript	A-149	A.2.6
K-3	Joseph Mangano	Afternoon Meeting Transcript	A-155	A.2.6
K-4	Joseph Mangano	Afternoon Meeting Transcript	A-155	A.2.6
K-5	Joseph Mangano	Afternoon Meeting Transcript	A-155	A.2.6
K-6	Joseph Mangano	Afternoon Meeting Transcript	A-147	A.2.6
K-7	Joseph Mangano	Afternoon Meeting Transcript	A-152	A.2.6
K-8	Joseph Mangano	Afternoon Meeting Transcript	A-63	A.2.1
L-1	John Rayment	Afternoon Meeting Transcript	A-71	A.2.2
L-2	John Rayment	Afternoon Meeting Transcript	A-73	A.2.2
M-1	Ed Stroup	Afternoon Meeting Transcript	A-71	A.2.2
M-2	Ed Stroup	Afternoon Meeting Transcript	A-174	A.2.7
M-3	Ed Stroup	Afternoon Meeting Transcript	A-136	A.2.5
M-4	Ed Stroup	Afternoon Meeting Transcript	A-209	A.2.10
M-5	Ed Stroup	Afternoon Meeting Transcript	A-136	A.2.5
M-6	Ed Stroup	Afternoon Meeting Transcript	A-71	A.2.2
N-1	Paul Gunter	Evening Meeting Transcript	A-224	A.2.13
N-2	Paul Gunter	Evening Meeting Transcript	A-140	A.2.5
O-1	Donald Warren	Evening Meeting Transcript	A-206	A.2.13
O-2	Donald Warren	Evening Meeting Transcript	A-191	A.2.10
O-3	Donald Warren	Evening Meeting Transcript	A-63	A.2.1
O-4	Donald Warren	Evening Meeting Transcript	A-191	A.2.10
O-5	Donald Warren	Evening Meeting Transcript	A-206	A.2.10
O-6	Donald Warren	Evening Meeting Transcript	A-236	A.2.13
O-8	Donald Warren	Evening Meeting Transcript	A-228	A.2.13
O-9	Donald Warren	Evening Meeting Transcript	A-226	A.2.13
O-10	Donald Warren	Evening Meeting Transcript	A-226	A.2.13

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Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
O-11	Donald Warren	Evening Meeting Transcript	A-191	A.2.10
O-12	Donald Warren	Evening Meeting Transcript	A-86	A.2.5
O-17	Donald Warren	Evening Meeting Transcript	A-235	A.2.13
P-1	Cindy Zipf	Evening Meeting Transcript	A-67	A.2.1
P-2	Cindy Zipf	Evening Meeting Transcript	A-67	A.2.1
P-3	Cindy Zipf	Evening Meeting Transcript	A-170	A.2.6
Q-1	Edith Gbur	Evening Meeting Transcript	A-155	A.2.6
Q-2	Edith Gbur	Evening Meeting Transcript	A-159	A.2.6
Q-3	Edith Gbur	Evening Meeting Transcript	A-150	A.2.6
Q-4	Edith Gbur	Evening Meeting Transcript	A-63	A.2.1
R-1	Jack Nosti	Evening Meeting Transcript	A-192	A.2.10
R-2	Jack Nosti	Evening Meeting Transcript	A-193	A.2.10
R-3	Jack Nosti	Evening Meeting Transcript	A-72	A.2.2
R-4	Jack Nosti	Evening Meeting Transcript	A-72	A.2.2
S-1	Ed Stroup	Evening Meeting Transcript	A-206	A.2.10
S-2	Ed Stroup	Evening Meeting Transcript	A-207	A.2.10
S-3	Ed Stroup	Evening Meeting Transcript	A-71	A.2.2
S-4	Ed Stroup	Evening Meeting Transcript	A-174	A.2.7
S-5	Ed Stroup	Evening Meeting Transcript	A-136	A.2.5
S-6	Ed Stroup	Evening Meeting Transcript	A-209	A.2.10
S-7	Ed Stroup	Evening Meeting Transcript	A-136	A.2.5
S-8	Ed Stroup	Evening Meeting Transcript	A-71	A.2.2
T-1	William DeCamp, Jr.	Evening Meeting Transcript	A-86	A.2.5
U-1	Roberto Weinmann	Evening Meeting Transcript	A-154	A.2.6
W-1	David Most	Evening Meeting Transcript	A-209	A.2.10
W-2	David Most	Evening Meeting Transcript	A-209	A.2.10
W-3	David Most	Evening Meeting Transcript	A-208	A.2.10
W-4	David Most	Evening Meeting Transcript	A-209	A.2.10
W-5	David Most	Evening Meeting Transcript	A-210	A.2.10
W-6	David Most	Evening Meeting Transcript	A-72	A.2.2
X-1	Edward Shilling	Evening Meeting Transcript	A-226	A.2.13
X-2	Edward Shilling	Evening Meeting Transcript	A-221	A.2.13
X-3	Edward Shilling	Evening Meeting Transcript	A-210	A.2.10
Y-1	David Sims	Evening Meeting Transcript	A-210	A.2.10
Y-2	David Sims	Evening Meeting Transcript	A-75	A.2.3
Y-3	David Sims	Evening Meeting Transcript	A-75	A.2.3
Y-4	David Sims	Evening Meeting Transcript	A-210	A.2.10
Y-5	David Sims	Evening Meeting Transcript	A-67	A.2.1

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
Y-6	David Sims	Evening Meeting Transcript	A-210	A.2.10
Y-7	David Sims	Evening Meeting Transcript	A-175	A.2.7
Y-8	David Sims	Evening Meeting Transcript	A-150	A.2.6
Z-1	Jennifer Nelson	Evening Meeting Transcript	A-73	A.2.2
Z-2	Jennifer Nelson	Evening Meeting Transcript	A-13	A.2.5
Z-3	Jennifer Nelson	Evening Meeting Transcript	A-145	A.2.5
Z-4	Jennifer Nelson	Evening Meeting Transcript	A-73	A.2.2
Z-5	Jennifer Nelson	Evening Meeting Transcript	A-72	A.2.2
AA-1	Wayne Romberg	Evening Meeting Transcript	A-72	A.2.2
AA-2	Wayne Romberg	Evening Meeting Transcript	A-136	A.2.5
AA-3	Wayne Romberg	Evening Meeting Transcript	A-72	A.2.2
BB-1	Gina Guerrazzi	Evening Meeting Transcript	A-159	A.2.6
BB-2	Gina Guerrazzi	Evening Meeting Transcript	A-206	A.2.10
BB-3	Gina Guerrazzi	Evening Meeting Transcript	A-159	A.2.6
CC-1	Eugene Creamer	Letter (ML062610236)	A-62	A.2.1
CC-2	Eugene Creamer	Letter (ML062610236)	A-76	A.2.4
CC-3	Eugene Creamer	Letter (ML062610236)	A-212	A.2.11
CC-4	Eugene Creamer	Letter (ML062610236)	A-78	A.2.4
CC-5	Eugene Creamer	Letter (ML062610236)	A-204	A.2.10
DD-1	Pat Crocker	Letter (ML062060443)	A-72	A.2.2
EE-1	Scott Cullen	Letter (ML062550163)	A-221	A.2.13
EE-2	Scott Cullen	Letter (ML062550163)	A-74	A.2.3
EE-3	Scott Cullen	Letter (ML062550163)	A-221	A.2.13
EE-4	Scott Cullen	Letter (ML062550163)	A-237	A.2.13
EE-5	Scott Cullen	Letter (ML062550163)	A-177	A.2.8
EE-6	Scott Cullen	Letter (ML062550163)	A-226	A.2.13
EE-7	Scott Cullen	Letter (ML062550163)	A-178	A.2.8
EE-8	Scott Cullen	Letter (ML062550163)	A-155	A.2.6
EE-9	Scott Cullen	Letter (ML062550163)	A-238	A.2.13
EE-10	Scott Cullen	Letter (ML062550163)	A-178	A.2.8
EE-11	Scott Cullen	Letter (ML062550163)	A-131	A.2.5
EE-12	Scott Cullen	Letter (ML062550163)	A-105	A.2.5
EE-13	Scott Cullen	Letter (ML062550163)	A-144	A.2.5
EE-14	Scott Cullen	Letter (ML062550163)	A-186	A.2.9
EE-15	Scott Cullen	Letter (ML062550163)	A-222	A.2.13
EE-16	Scott Cullen	Letter (ML062550163)	A-224	A.2.13
EE-17	Scott Cullen	Letter (ML062550163)	A-239	A.2.13
EE-18	Scott Cullen	Letter (ML062550163)	A-179	A.2.8

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Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
FF-1	Willie DeCamp	Letter (ML062610248)	A-189	A.2.9
GG-1	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-123	A.2.5
GG-2	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-97	A.2.5
GG-3	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-86	A.2.5
GG-4	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-86	A.2.5
GG-5	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-86	A.2.5
GG-6	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-98	A.2.5
GG-7	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-99	A.2.5
GG-8	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-125	A.2.5
GG-9	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-127	A.2.5
GG-10	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-101	A.2.5
GG-11	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-127	A.2.5
GG-12	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-87	A.2.5
GG-15	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-132	A.2.5

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
GG-16	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-132	A.2.5
GG-17	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-142	A.2.5
GG-18	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-171	A.2.6
GG-19	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-103	A.2.5
GG-20	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-201	A.2.10
GG-21	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-201	A.2.10
GG-22	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-203	A.2.10
GG-23	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-203	A.2.10
GG-24	Tim Dillingham, Jennifer Samson, Cindy Zipf	Letter (ML062610244)	A-74	A.2.3
HH-1	John Filippelli	Letter (ML062610242)	A-94	A.2.5
HH-2	John Filippelli	Letter (ML062610242)	A-134	A.2.5
HH-3	John Filippelli	Letter (ML062610242)	A-188	A.2.9
HH-4	John Filippelli	Letter (ML062610242)	A-89	A.2.5
HH-5	John Filippelli	Letter (ML062610242)	A-89	A.2.5
HH-6	John Filippelli	Letter (ML062610242)	A-95	A.2.5
HH-7	John Filippelli	Letter (ML062610242)	A-117	A.2.5
HH-8	John Filippelli	Letter (ML062610242)	A-110	A.2.5
HH-9	John Filippelli	Letter (ML062610242)	A-205	A.2.10
HH-10	John Filippelli	Letter (ML062610242)	A-205	A.2.10
HH-11	John Filippelli	Letter (ML062610242)	A-205	A.2.10
HH-12	John Filippelli	Letter (ML062610242)	A-135	A.2.5
HH-13	John Filippelli	Letter (ML062610242)	A-135	A.2.5
HH-14	John Filippelli	Letter (ML062610242)	A-135	A.2.5

Appendix A

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
HH-15	John Filippelli	Letter (ML062610242)	A-188	A.2.9
HH-16	John Filippelli	Letter (ML062610242)	A-188	A.2.9
II-1	Michael P. Gallagher	Letter (ML062550161)	A-211	A.2.11
II-2	Michael P. Gallagher	Letter (ML062550161)	A-174	A.2.7
II-3	Michael P. Gallagher	Letter (ML062550161)	A-220	A.2.13
II-4	Michael P. Gallagher	Letter (ML062550161)	A-219	A.2.11
JJ-1	Edith Gbur	Letter (ML062550166)	A-163	A.2.6
JJ-2	Edith Gbur	Letter (ML062550166)	A-163	A.2.6
KK-1	Edith Gbur	Letter (ML062610245)	A-167	A.2.6
KK-2	Edith Gbur	Letter (ML062610245)	A-171	A.2.6
KK-3	Edith Gbur	Letter (ML062610245)	A-171	A.2.6
KK-4	Edith Gbur	Letter (ML062610245)	A-168	A.2.6
KK-5	Edith Gbur	Letter (ML062610245)	A-169	A.2.6
KK-6	Edith Gbur	Letter (ML062610245)	A-170	A.2.6
KK-7	Edith Gbur	Letter (ML062610245)	A-171	A.2.6
KK-8	Edith Gbur	Letter (ML062610245)	A-70	A.2.1
LL-1	William Herring	Letter (ML062060441)	A-72	A.2.2
LL-2	William Herring	Letter (ML062060441)	A-72	A.2.2
LL-3	William Herring	Letter (ML062060441)	A-72	A.2.2
LL-4	William Herring	Letter (ML062060441)	A-73	A.2.2
LL-5	William Herring	Letter (ML062060441)	A-208	A.2.10
MM-1	Julia Huff	Letter (ML062610416)	A-139	A.2.5
MM-2	Julia Huff	Letter (ML062610416)	A-197	A.2.10
MM-3	Julia Huff	Letter (ML062610416)	A-68	A.2.1
MM-4	Julia Huff	Letter (ML062610416)	A-69	A.2.1
MM-5	Julia Huff	Letter (ML062610416)	A-82	A.2.4
MM-6	Julia Huff	Letter (ML062610416)	A-74	A.2.3
MM-7	Julia Huff	Letter (ML062610416)	A-68	A.2.1
MM-8	Julia Huff	Letter (ML062610416)	A-65	A.2.1
MM-9	Julia Huff	Letter (ML062610416)	A-89	A.2.5
MM-10	Julia Huff	Letter (ML062610416)	A-197	A.2.10
MM-11	Julia Huff	Letter (ML062610416)	A-115	A.2.5
MM-12	Julia Huff	Letter (ML062610416)	A-199	A.2.10
MM-13	Julia Huff	Letter (ML062610416)	A-65	A.2.1
MM-14	Julia Huff	Letter (ML062610416)	A-199	A.2.10
MM-15	Julia Huff	Letter (ML062610416)	A-163	A.2.6
MM-16	Julia Huff	Letter (ML062610416)	A-163	A.2.6
MM-17	Julia Huff	Letter (ML062610416)	A-163	A.2.6

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
MM-18	Julia Huff	Letter (ML062610416)	A-137	A.2.5
MM-19	Julia Huff	Letter (ML062610416)	A-175	A.2.7
MM-20	Julia Huff	Letter (ML062610416)	A-83	A.2.4
MM-21	Julia Huff	Letter (ML062610416)	A-83	A.2.4
MM-22	Julia Huff	Letter (ML062610416)	A-84	A.2.4
MM-23	Julia Huff	Letter (ML062610416)	A-83	A.2.4
MM-24	Julia Huff	Letter (ML062610416)	A-84	A.2.4
MM-25	Julia Huff	Letter (ML062610416)	A-84	A.2.4
MM-26	Julia Huff	Letter (ML062610416)	A-115	A.2.5
MM-27	Julia Huff	Letter (ML062610416)	A-95	A.2.5
MM-28	Julia Huff	Letter (ML062610416)	A-116	A.2.5
MM-29	Julia Huff	Letter (ML062610416)	A-95	A.2.5
MM-30	Julia Huff	Letter (ML062610416)	A-95	A.2.5
MM-31	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-32	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-33	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-34	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-35	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-36	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-37	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-38	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-39	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-40	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-41	Julia Huff	Letter (ML062610416)	A-116	A.2.5
MM-42	Julia Huff	Letter (ML062610416)	A-96	A.2.5
MM-43	Julia Huff	Letter (ML062610416)	A-143	A.2.5
MM-44	Julia Huff	Letter (ML062610416)	A-143	A.2.5
MM-45	Julia Huff	Letter (ML062610416)	A-143	A.2.5
MM-46	Julia Huff	Letter (ML062610416)	A-144	A.2.5
MM-47	Julia Huff	Letter (ML062610416)	A-145	A.2.5
MM-48	Julia Huff	Letter (ML062610416)	A-137	A.2.5
MM-49	Julia Huff	Letter (ML062610416)	A-145	A.2.5
MM-50	Julia Huff	Letter (ML062610416)	A-146	A.2.5
MM-51	Julia Huff	Letter (ML062610416)	A-165	A.2.6
MM-52	Julia Huff	Letter (ML062610416)	A-166	A.2.6
MM-53	Julia Huff	Letter (ML062610416)	A-175	A.2.7
MM-54	Julia Huff	Letter (ML062610416)	A-85	A.2.4
MM-55	Julia Huff	Letter (ML062610416)	A-97	A.2.5

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Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
MM-56	Julia Huff	Letter (ML062610416)	A-116	A.2.5
MM-57	Julia Huff	Letter (ML062610416)	A-116	A.2.5
MM-58	Julia Huff	Letter (ML062610416)	A-91	A.2.5
MM-59	Julia Huff	Letter (ML062610416)	A-92	A.2.5
MM-60	Julia Huff	Letter (ML062610416)	A-92	A.2.5
MM-61	Julia Huff	Letter (ML062610416)	A-238	A.2.13
MM-62	Julia Huff	Letter (ML062610416)	A-144	A.2.5
MM-63	Julia Huff	Letter (ML062610416)	A-146	A.2.5
MM-64	Julia Huff	Letter (ML062610416)	A-117	A.2.5
MM-65	Julia Huff	Letter (ML062610416)	A-92	A.2.5
MM-66	Julia Huff	Letter (ML062610416)	A-92	A.2.5
MM-67	Julia Huff	Letter (ML062610416)	A-92	A.2.5
MM-68	Julia Huff	Letter (ML062610416)	A-144	A.2.5
MM-69	Julia Huff	Letter (ML062610416)	A-146	A.2.5
MM-70	Julia Huff	Letter (ML062610416)	A-187	A.2.9
MM-71	Julia Huff	Letter (ML062610416)	A-198	A.2.10
MM-72	Julia Huff	Letter (ML062610416)	A-199	A.2.10
MM-73	Julia Huff	Letter (ML062610416)	A-199	A.2.10
MM-74	Julia Huff	Letter (ML062610416)	A-200	A.2.10
MM-75	Julia Huff	Letter (ML062610416)	A-200	A.2.10
MM-76	Julia Huff	Letter (ML062610416)	A-206	A.2.10
MM-77	Julia Huff	Letter (ML062610416)	A-210	A.2.10
MM-78	Julia Huff	Letter (ML062610416)	A-239	A.2.13
MM-79	Julia Huff	Letter (ML062610416)	A-211	A.2.10
MM-80	Julia Huff	Letter (ML062610416)	A-65	A.2.1
NN-1	Tom Jones	Letter (ML062550170)	A-74	A.2.3
NN-2	Tom Jones	Letter (ML062550170)	A-155	A.2.6
OO-1	Michael J. Kennish	Letter (ML062550158)	A-92	A.2.5
OO-2	Michael J. Kennish	Letter (ML062550158)	A-93	A.2.5
OO-3	Michael J. Kennish	Letter (ML062550158)	A-93	A.2.5
OO-4	Michael J. Kennish	Letter (ML062550158)	A-104	A.2.5
OO-5	Michael J. Kennish	Letter (ML062550158)	A-101	A.2.5
OO-6	Michael J. Kennish	Letter (ML062550158)	A-93	A.2.5
OO-7	Michael J. Kennish	Letter (ML062550158)	A-64	A.2.1
PP-1	Kenneth Koschek	Letter (ML062610237)	A-161	A.2.6
PP-2	Kenneth Koschek	Letter (ML062610237)	A-160	A.2.6
PP-3	Kenneth Koschek	Letter (ML062610237)	A-106	A.2.5
PP-4	Kenneth Koschek	Letter (ML062610237)	A-106	A.2.5

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
PP-5	Kenneth Koschek	Letter (ML062610237)	A-173	A.2.6
PP-6	Kenneth Koschek	Letter (ML062610237)	A-187	A.2.9
PP-7	Kenneth Koschek	Letter (ML062610237)	A-162	A.2.6
PP-8	Kenneth Koschek	Letter (ML062610237)	A-180	A.2.8
PP-9	Kenneth Koschek	Letter (ML062610237)	A-222	A.2.13
PP-10	Kenneth Koschek	Letter (ML062610237)	A-228	A.2.13
PP-11	Kenneth Koschek	Letter (ML062610237)	A-220	A.2.12
PP-12	Kenneth Koschek	Letter (ML062610237)	A-193	A.2.10
PP-13	Kenneth Koschek	Letter (ML062610237)	A-193	A.2.10
PP-14	Kenneth Koschek	Letter (ML062610237)	A-194	A.2.10
PP-15	Kenneth Koschek	Letter (ML062610237)	A-194	A.2.10
PP-16	Kenneth Koschek	Letter (ML062610237)	A-106	A.2.5
PP-17	Kenneth Koschek	Letter (ML062610237)	A-106	A.2.5
PP-18	Kenneth Koschek	Letter (ML062610237)	A-107	A.2.5
PP-19	Kenneth Koschek	Letter (ML062610237)	A-107	A.2.5
PP-20	Kenneth Koschek	Letter (ML062610237)	A-108	A.2.5
PP-21	Kenneth Koschek	Letter (ML062610237)	A-108	A.2.5
PP-22	Kenneth Koschek	Letter (ML062610237)	A-109	A.2.5
PP-23	Kenneth Koschek	Letter (ML062610237)	A-109	A.2.5
PP-24	Kenneth Koschek	Letter (ML062610237)	A-110	A.2.5
PP-25	Kenneth Koschek	Letter (ML062610237)	A-110	A.2.5
PP-26	Kenneth Koschek	Letter (ML062610237)	A-137	A.2.5
PP-27	Kenneth Koschek	Letter (ML062610237)	A-212	A.2.11
PP-28	Kenneth Koschek	Letter (ML062610237)	A-212	A.2.11
PP-29	Kenneth Koschek	Letter (ML062610237)	A-212	A.2.11
PP-30	Kenneth Koschek	Letter (ML062610237)	A-212	A.2.11
PP-31	Kenneth Koschek	Letter (ML062610237)	A-213	A.2.11
PP-32	Kenneth Koschek	Letter (ML062610237)	A-213	A.2.11
PP-33	Kenneth Koschek	Letter (ML062610237)	A-213	A.2.11
PP-34	Kenneth Koschek	Letter (ML062610237)	A-213	A.2.11
PP-35	Kenneth Koschek	Letter (ML062610237)	A-213	A.2.11
PP-36	Kenneth Koschek	Letter (ML062610237)	A-111	A.2.5
PP-37	Kenneth Koschek	Letter (ML062610237)	A-214	A.2.11
PP-38	Kenneth Koschek	Letter (ML062610237)	A-214	A.2.11
PP-39	Kenneth Koschek	Letter (ML062610237)	A-214	A.2.11
PP-40	Kenneth Koschek	Letter (ML062610237)	A-214	A.2.11
PP-41	Kenneth Koschek	Letter (ML062610237)	A-215	A.2.11
PP-42	Kenneth Koschek	Letter (ML062610237)	A-214	A.2.11

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Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
PP-43	Kenneth Koschek	Letter (ML062610237)	A-216	A.2.11
PP-44	Kenneth Koschek	Letter (ML062610237)	A-215	A.2.11
PP-45	Kenneth Koschek	Letter (ML062610237)	A-215	A.2.11
PP-46	Kenneth Koschek	Letter (ML062610237)	A-215	A.2.11
PP-47	Kenneth Koschek	Letter (ML062610237)	A-215	A.2.11
PP-48	Kenneth Koschek	Letter (ML062610237)	A-113	A.2.5
PP-49	Kenneth Koschek	Letter (ML062610237)	A-216	A.2.11
PP-50	Kenneth Koschek	Letter (ML062610237)	A-216	A.2.11
PP-51	Kenneth Koschek	Letter (ML062610237)	A-216	A.2.11
PP-52	Kenneth Koschek	Letter (ML062610237)	A-217	A.2.11
PP-53	Kenneth Koschek	Letter (ML062610237)	A-217	A.2.11
PP-54	Kenneth Koschek	Letter (ML062610237)	A-194	A.2.10
PP-55	Kenneth Koschek	Letter (ML062610237)	A-195	A.2.10
PP-56	Kenneth Koschek	Letter (ML062610237)	A-195	A.2.10
PP-57	Kenneth Koschek	Letter (ML062610237)	A-218	A.2.11
PP-58	Kenneth Koschek	Letter (ML062610237)	A-217	A.2.11
PP-59	Kenneth Koschek	Letter (ML062610237)	A-217	A.2.11
PP-60	Kenneth Koschek	Letter (ML062610237)	A-195	A.2.10
PP-61	Kenneth Koschek	Letter (ML062610237)	A-218	A.2.11
PP-62	Kenneth Koschek	Letter (ML062610237)	A-219	A.2.11
PP-63	Kenneth Koschek	Letter (ML062610237)	A-78	A.2.4
PP-64	Kenneth Koschek	Letter (ML062610237)	A-174	A.2.7
PP-65	Kenneth Koschek	Letter (ML062610237)	A-79	A.2.4
PP-66	Kenneth Koschek	Letter (ML062610237)	A-81	A.2.4
PP-67	Kenneth Koschek	Letter (ML062610237)	A-83	A.2.4
PP-68	Kenneth Koschek	Letter (ML062610237)	A-196	A.2.10
QQ-1	Kenneth Koschek	Letter (ML062620348)	A-118	A.2.5
QQ-2	Kenneth Koschek	Letter (ML062620348)	A-118	A.2.5
QQ-3	Kenneth Koschek	Letter (ML062620348)	A-118	A.2.5
QQ-4	Kenneth Koschek	Letter (ML062620348)	A-122	A.2.5
QQ-5	Kenneth Koschek	Letter (ML062620348)	A-97	A.2.5
QQ-6	Kenneth Koschek	Letter (ML062620348)	A-122	A.2.5
QQ-7	Kenneth Koschek	Letter (ML062620348)	A-123	A.2.5
QQ-8	Kenneth Koschek	Letter (ML062620348)	A-123	A.2.5
QQ-9	Kenneth Koschek	Letter (ML062620348)	A-118	A.2.5
QQ-10	Kenneth Koschek	Letter (ML062620348)	A-161	A.2.6
QQ-11	Kenneth Koschek	Letter (ML062620348)	A-176	A.2.7
QQ-12	Kenneth Koschek	Letter (ML062620348)	A-201	A.2.10

Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source^(a)	Page of Comment	Section(s) Where Addressed
RR-1	Walter and Lorraine Lenskold	Letter (ML062610243)	A-211	A.2.10
SS-1	Joseph Mangano	Letter (ML062050309)	A-150	A.2.6
SS-2	Joseph Mangano	Letter (ML062050309)	A-150	A.2.6
SS-3	Joseph Mangano	Letter (ML062050309)	A-156	A.2.6
SS-4	Joseph Mangano	Letter (ML062050309)	A-156	A.2.6
SS-5	Joseph Mangano	Letter (ML062050309)	A-147	A.2.6
SS-6	Joseph Mangano	Letter (ML062050309)	A-152	A.2.6
SS-7	Joseph Mangano	Letter (ML062050309)	A-148	A.2.6
SS-8	Joseph Mangano	Letter (ML062050309)	A-150	A.2.6
TT-1	Mary Mazzo	Letter (ML062610240)	A-75	A.2.3
TT-2	Mary Mazzo	Letter (ML062610240)	A-211	A.2.10
TT-3	Mary Mazzo	Letter (ML062610240)	A-222	A.2.13
TT-4	Mary Mazzo	Letter (ML062610240)	A-75	A.2.3
UU-1	Mary Mazzo	Letter (ML062650456)	A-211	A.2.10
VV-1	David McKeon	Letter (ML062550168)	A-158	A.2.6
WW-1	Andrew L. Raddant	Letter (ML063000134)	A-140	A.2.5
XX-1	Dotty Reynolds	Letter (ML062060436)	A-181	A.2.8
XX-2	Dotty Reynolds	Letter (ML062060436)	A-235	A.2.13
XX-3	Dotty Reynolds	Letter (ML062060436)	A-221	A.2.13
XX-4	Dotty Reynolds	Letter (ML062060436)	A-238	A.2.13
XX-5	Dotty Reynolds	Letter (ML062060436)	A-110	A.2.5
XX-6	Dotty Reynolds	Letter (ML062060436)	A-208	A.2.10
XX-7	Dotty Reynolds	Letter (ML062060436)	A-237	A.2.13
XX-8	Dotty Reynolds	Letter (ML062060436)	A-64	A.2.1
YY-1	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-93	A.2.5
YY-2	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-76	A.2.4
YY-3	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-94	A.2.5
YY-4	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-181	A.2.8
YY-5	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-228	A.2.13
YY-6	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-235	A.2.13
YY-7	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-159	A.2.6

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Table A-2. Comments Received on the Draft SEIS (Cont.)

Comment ID	Commenter	Comment Source ^(a)	Page of Comment	Section(s) Where Addressed
YY-8	Joan K. Rubin, Gail Marsh Saxter	Letter (ML062610239)	A-189	A.2.10
ZZ-1	Rep. Jim Saxton	Letter (ML062480041)	A-182	A.2.8
AAA-1	Robert Scro	Letter (ML062610234)	A-102	A.2.5
AAA-2	Robert Scro	Letter (ML062610234)	A-114	A.2.5
BBB-1	Richard Webster	Letter (ML062610359)	A-227	A.2.13
BBB-2	Richard Webster	Letter (ML062610359)	A-222	A.2.13
BBB-3	Richard Webster	Letter (ML062610359)	A-187	A.2.9
BBB-4	Richard Webster	Letter (ML062610359)	A-223	A.2.13
BBB-5	Richard Webster	Letter (ML062610359)	A-228	A.2.13
BBB-6	Richard Webster	Letter (ML062610359)	A-223	A.2.13
BBB-7	Richard Webster	Letter (ML062610359)	A-183	A.2.8
BBB-8	Richard Webster	Letter (ML062610359)	A-229	A.2.13
BBB-9	Richard Webster	Letter (ML062610359)	A-228	A.2.13
BBB-10	Richard Webster	Letter (ML062610359)	A-183	A.2.8
BBB-11	Richard Webster	Letter (ML062610359)	A-184	A.2.8
BBB-12	Richard Webster	Letter (ML062610359)	A-224	A.2.13
BBB-13	Richard Webster	Letter (ML062610359)	A-185	A.2.8
BBB-14	Richard Webster	Letter (ML062610359)	A-70	A.2.1
CCC-1	Richard Webster	Letter (ML062680033)	A-187	A.2.9

(a) The afternoon and evening transcripts can be found in ADAMS under accession numbers ML062220458 and ML062220526, respectively.

There was no new and significant information provided on Category 1 issues, and for most Category 2 issues, no information that required further evaluation. Therefore, the conclusions in the GEIS and draft SEIS remained valid and bounding for most issues, and no further evaluation was performed. However, additional evaluation of the impacts of the cooling system on aquatic resources was performed and resulted in some changes to conclusions relative to those in the draft SEIS.

Comments without a supporting technical basis or without any new information are discussed in this appendix, and not in other sections of this report. Relevant references that address the issues within the regulatory authority of the NRC are provided where appropriate. Many of these references can be obtained from the NRC Public Document Room.

Within each section of Part II of this appendix (A.2.1 through A.2.19), similar comments are grouped together for ease of reference, and a summary description of the comments is given, followed by the NRC staff's response. Where the comment or question resulted in a change in

the text of the draft report, the corresponding response refers the reader to the appropriate section of this SEIS where the change was made. Revisions to the text in the draft SEIS are designated by vertical lines beside the text in the final SEIS.

A.2 Comments and Responses

Comments in this section are grouped in the following categories:

- A.2.1 Comments Concerning the License Renewal Process, p. A-62
- A.2.2 Comments in Support of License Renewal at Oyster Creek Nuclear Generating Station, p. A-71
- A.2.3 General Comments in Opposition to License Renewal at Oyster Creek Nuclear Generating Station, p. A-74
- A.2.4 Comments Concerning Surface-Water Quality, Hydrology, and Use Issues, p. A-76
- A.2.5 Comments Concerning Aquatic Ecology, Terrestrial Ecology, General Ecology, and Threatened and Endangered Species Issues, p. A-85
- A.2.6 Comments Concerning Human Health Issues, p. A-147
- A.2.7 Comments Concerning Socioeconomic Issues, p. A-174
- A.2.8 Comments Concerning Postulated Accidents, p. A-177
- A.2.9 Comments Concerning Uranium Fuel Cycle and Waste Management Issues, p. A-186
- A.2.10 Comments Concerning Alternatives, p. A-189
- A.2.11 Comments Concerning Editorial Issues, p. A-211
- A.2.12 Comments Concerning Decommissioning Issues, p. A-220
- A.2.13 Issues Outside the Scope of the Environmental Review for License Renewal: Safeguards and Security; Operational Safety; Aging Management; Emergency Response and Preparedness; and Need for Power, p. A-220

A.2.1 Comments Concerning the License Renewal Process

Comment: The Atomic Energy Commission issued a final EIS for Oyster Creek Nuclear Generating Station in 1974. Oyster Creek Nuclear Generating Station ascended to operation in 1969 and the EIS is an “after the fact” EIS. (CC-1)

Response: *Several of the first environmental impact statements produced for construction and operation of commercial nuclear power plants (including that for OCNGS) were produced after construction of the plant had already occurred. This post-construction assessment occurred because construction, and, in some cases, operations, preceded the passage of NEPA. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: So I would like to request that, as Representative Saxton had requested, that the National Academy of Sciences do an outside review of your review and also that the Department of Environmental Protection have some say in this renewal and not just one organization because our lives are dependent on this. (F-2)

Comment: I have here a letter from Congressman Saxton, James Saxton. And it says, in effect, "Like you, I have concerns about the safety and security of the plant. With this in mind, I have introduced H.R. 966, a bill that would require the National Academy of Sciences to conduct an independent assessment of safety and security issues prior to the NRC granting relicensing approval.

"The bill would also require the Commission to evaluate the facility with respect to health risks, vulnerability to terrorist attacks, evacuation plans, population increases, ability to store nuclear waste, and the impact of nuclear accident are during the relicensing process. The bill is currently pending before the House Committee of Energy and Commerce." (H-6)

Comment: Someone mentioned the Academy of Sciences. You have to have an outside, independent body doing assessment on things. You can't keep things locked into a state agency or a Federal agency. You need to have an independent body that has no buy-in, no monetary reason of interest, namely an interest in doing it for scientific purposes. (I-2)

Comment: I urge the NRC, number one, to commission independent health studies on these topics; number two, to not take any position on reactor extension until these issues have been completely examined and completely resolved because there is nothing more important than human health. (K-8)

Comment: I'm here because of my concern that this plant may be re-licensed and continue to operate for another 20 years, and especially because of what I feel is a tremendously biased and inadequate environmental impact statement that's being proposed by the NRC here. The NRC should be protecting us, not serving Exelon and Oyster Creek. When they are analyzing data for their environmental impact statement, it should not be the data that's provided by Oyster Creek. (O-3)

Comment: We would like to recommend that an independent study of radiation from Oyster Creek be undertaken as part of the Environmental Impact Statement. (Q-4)

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Comment: The GEIS has not been reviewed and assessed by a reputable independent scientific body such as the National Academy of Science. If a scientific committee of the National Academy of Science had been solicited to review the sampling design and procedures of AmerGen and previous plant owners and allowed to submit recommendations of a new sampling plan, the flaws recounted above in the aquatic environmental databases of the OCNGS could have been circumvented. The lack of an external review of the GEIS by an independent scientific body creates skepticism not only in the scientific community but also in the lay community. The credibility of the GEIS and the NRC effort related to the license renewal process of the OCNGS really depends on an acknowledged objective and effective review by a credible independent body not affiliated with AmerGen or any government agency. Such a review is necessary to ensure scientific rigor of the licensing process. The NRC's work on the OCNGS will not be accepted or approved by the scientific community without such an external review. (OO-7)

Comment: The decision regarding license renewal could mean life or death for thousands; the potential health, safety and economic impacts on New Jersey are enormous. Congressman Jim Saxton, in support of requests by many elected officials and citizen groups, has introduced H.R. 966, a bill that would require an independent assessment of safety and security issues by the National Academy of Sciences Research Council. It is imperative that the Academy of Sciences determine that Oyster Creek nuclear plant is safe, secure and necessary, prior to NRC relicensing approval, or Oyster Creek must be shut down. (XX-8)

Response: *The NRC is an independent agency established by the Energy Reorganization Act of 1974 to regulate civilian use of nuclear materials. The NRC's mission is to regulate the nation's civilian use of by-product, source, and special nuclear materials to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. As part of this mission, the NRC is responsible for the review and issuance of initial licenses and renewed licenses for nuclear power facilities.*

The Advisory Committee on Reactor Safeguards (ACRS) is an advisory committee under the Federal Advisory Committee Act (FACA) mandated by the Atomic Energy Act of 1954, as amended. The ACRS is independent of the NRC staff and reports directly to the Commission, which appoints ACRS members. The operational practices of the ACRS are governed by the provisions of the FACA. The ACRS is composed of recognized technical experts in their fields. It is structured so that experts representing many technical perspectives can provide independent advice, which can be factored into the Commission's decision-making process. Most ACRS meetings are open to the public, and any member of the public may request an opportunity to make an oral statement during the committee meeting.

During the license renewal process, the ACRS acts as an independent, third-party, oversight group that reviews and makes recommendations to the Commission on the safety aspects of renewal applications. The ACRS mandate does not include NEPA reviews.

In conducting the environmental evaluation presented in the SEIS, the NRC uses information from a variety of sources, including the applicant's Environmental Report (ER), data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. The NRC's role in the environmental review process is to provide a fair and unbiased evaluation of the impacts of operations during the license renewal term.

The environmental analysis conducted by the NRC for license renewal is mandated by NEPA. NEPA requires that the analysis be conducted by the agency that takes the action, which, in this case, is the NRC. NEPA does not require an independent review of environmental analysis by the National Academy of Sciences or another independent scientific body. The EPA has the responsibility to review EISs that are prepared by other Federal agencies (including the NRC). This review responsibility is a requirement placed on the EPA by NEPA. The EPA's review provides a measure of the NRC's adherence to NEPA. Additionally, the EPA comments on draft EISs under its statutory areas of responsibility such as clean water and clean air. Other Federal agencies are invited to participate in the scoping process and are afforded the opportunity to review and comment on the draft EISs.

The comments are related to the overall license renewal process. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: I think that these conclusions of the NRC are based on old data, a static attitude towards the data that does exist, an assumption that if things haven't gotten worse, they're all right and in general a very negative, not-caring attitude about public welfare. (D-2)

Comment: Another fundamental flaw of the DEIS is that the NRC appears to have simply regurgitated information supplied to it by the applicant and never confirms the veracity of the information. As a result, misrepresentations and inaccuracies have been interwoven and form the backbone of NRC's conclusions in the DEIS. (MM-8)

Comment: In addition to the lack of information about the Bay populations, a review of the DEIS makes it clear that there is no thorough, pre-construction baseline from which to determine the impacts of the Facility. The 1974 Final Environmental Statement was completed after the Facility had been operating for 5 years, and as such cannot be used as a baseline. Data collected in the late 1960s would have been affected by the construction of the Facility which had already begun, and would also be skewed. Finally, this document is not readily available to the public and appears to be only available by making a Freedom of Information Act request. (MM-13)

Comment: For the reasons articulated in this comment letter, NRC should not and cannot make any conclusions about either the environmental impact associated with the proposed

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relicensing of the Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA. (MM-80)

Response: *The SEIS presents an evaluation of the anticipated impacts of operations during the license renewal term. The NRC staff recognizes that the amount and quality of data available for NEPA evaluations sometimes fall short of ideal, but believes that there is sufficient information available to perform an assessment of the impacts of license renewal at OCNGS. The assessment presented in the SEIS is based on the best available information, drawing from a variety of sources, including data collected by AmerGen, the NJDEP, other governmental agencies, independent researchers, and others.*

Much data used in preparing the SEIS are current or less than 5 years old (e.g., radiological monitoring data, water quality data, impingement rates of sea turtles). The data from the 1980s that are referred to in the comments are related to the measured effects of operation of the cooling system on aquatic resources. Those data were collected to demonstrate compliance of cooling system operations with the Clean Water Act (CWA), specifically Sections 316(a) and 316(b), and were used as part of the basis of a NJPDES permit for station operations. As stated in the SEIS, OCNGS is currently operating under the provisions of that permit. Because that permit has expired but continues due to a timely renewal application, the NJDEP has developed a draft NJPDES permit with specific proposed alternatives to the existing cooling system. OCNGS is currently collecting additional impingement and entrainment data to determine compliance with the 316(b) Phase II regulations of the CWA, and those data will be used in developing the final NJPDES permit. If new and significant information becomes available in the future that demonstrates an increased impact on the aquatic environment as a result of continued station operation, the NRC staff expects the NJDEP to require modifications to the cooling system necessary to protect the resources through the NJPDES permitting process.

The assessment of impacts of license renewal does not evaluate impacts occurring today relative to the pre-construction environment, but rather, the impacts that the station would have on the existing environment over the license renewal period. Shortly after construction of OCNGS, the licensee estimated pre-construction baseline conditions in the vicinity of the station based on post-construction surveys of areas adjacent to the station.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: What about maybe licensing this plant for five years, not 20, because evolution is actually occurring in this world? I don't think 20 is a good number of years. It's a long time. (Y-5)

Response: *Extensive studies and experience have shown that commercial nuclear power facilities can be safely operated for more than 40 years. As a result, the NRC has provided an option in Title 10 of the Code of Federal Regulations (10 CFR) that allows owners of nuclear power reactors to seek license renewal for up to an additional 20 years with no limitations on the number of times the license may be renewed. The decision whether to seek license renewal, including the length of the renewal period, rests entirely with nuclear power reactor owners and typically is based on the plant's economic viability and whether it can continue to meet NRC safety and environmental requirements. The NRC bases its decision regarding license renewal on whether the facility would continue to meet the requirements for safe operation and whether the protection of the environment can be assured during the renewal term.*

Comment: We learned about the hearing from the Asbury Park Press and the article that they wrote about the other hearing that occurred the other day on the safety issues. So we are a coalition of 160-plus organizations that are concerned about marine water quality in the area, and when we're notified about these hearings, which is part of what the coalition is about, we distribute that to all the organizations. So there wasn't any time for us to engage that coalition, make them aware of the hearing. So I'm very concerned about the process. (P-1)

Response: *Prior to public meetings on the draft SEIS, the NRC typically attempts to contact all parties who have expressed interest and have provided contact information during the scoping process. In addition, the NRC places advertisements of the upcoming meetings in local and regional newspapers; publishes a notice in the Federal Register and on the NRC website; notifies local governmental organizations; and issues a press release and posts them in advance of the meeting. In the case of the draft SEIS meeting, all of these activities were done. However, the NRC did not directly contact the Clean Ocean Action about the meeting. We apologize for the oversight. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: I'm also concerned about the quality of the process because in the comments that we submitted during the scoping period, we raised some very serious, significant issues. Some of them were raised today and considered small. We categorically disagree and will be submitting our comments in full during the process. (P-2)

Response: *The scoping comments referred to in the comment were related to bioaccumulation of radionuclides in Barnegat Bay. The SEIS evaluates data from the Radiological Environmental Monitoring Program (REMP) conducted by AmerGen and the independent Environmental Surveillance and Monitoring Program (ESMP) conducted by the Bureau of*

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Nuclear Engineering with the NJDEP. Over the period of operation of OCNGS, these two programs have yielded consistent results. These data and their implications to radiation exposure are discussed in Section 2.2.7 of the SEIS. Additional detail on this topic has been provided in that section.

Comment: The statement of the purpose and need for the proposed action reveals much about the NRC's attitude toward the Facility. The purpose of the action is to maintain the status quo, regardless of the costs or the consequences. This flies in the face of the purposes and goals of the National Environmental Policy Act ("NEPA"). (MM-3)

Comment: NRC defines the purpose and need of the proposed action as merely providing an option of keeping a nuclear power plant online. DEIS at 1-8. NRC's decision to define the purpose and need for the project exclusively from Oyster Creek's perspective, making renewal of the license a foregone conclusion, is contrary to NEPA regulations and thirty-five years of NEPA jurisprudence.

Because the stated purpose and need of a federal action determines the range and analysis of alternatives, NRC's failure to properly define the purpose and need makes proper consideration of alternatives impossible. See City of New York v. Dep't of Transportation, 715 F.2d 732, 743 (2nd Cir. 1983) (it is arbitrary for an agency "to narrow the objective of its action artificially and thereby circumvent the requirement that relevant alternatives be considered."); see also, Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991) ("an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality.").

NRC defined the purpose and need exclusively from Oyster Creek's perspective, as simply issuing a renewal of an operating license. NRC appears to be equating Oyster Creek's corporate goals with its own objectives. While the goals of a private party applicant are, to a limited extent, relevant in determining a project's purpose and need, "[m]ore importantly, an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other Congressional directives." Citizens Against Burlington, 938 F.2d at 196.

Coupled with NEPA's mandate to act as stewards for present and future generation, see 42 U.S.C. § 4331(a) (2005), it is impossible for NRC to equate its statutory objectives with Oyster Creek's goal of maximizing profits on behalf of its shareholders. NRC cannot fulfill its NEPA obligations by simply looking to what is most convenient and profitable for Oyster Creek. See Van Abbema v. Fornell, 807 F.2d 633,638 (7th Cir. 1986) ("the evaluation of 'alternatives' mandated by NEPA is to be an evaluation of alternative means to accomplish the general goal of an action; it is not an evaluation of the alternative means by which a particular applicant can reach his goals."). NRC's narrowly defined purpose and need is arbitrary, capricious, an abuse

of discretion and otherwise not in accordance with law, as it precludes any analysis of a reasonable range of alternatives impermissibly rendering the result in this case a "foreordained formality." One of the purposes of NEPA was to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. 5 4321. The DEIS does nothing to forward those goals, as it suggests in the statement of purpose and need that the goal is to keep the Facility as an option for the State of New Jersey. There is no effort to prevent or eliminate damage to the environment. Further, the DEIS, which is riddled with flawed data, misrepresentations and bereft of any comprehensive information about the ecosystem directly impacted by the Facility, also fails to promote another of the goals of NEPA, namely to enrich the understanding of the ecological systems and natural resources important to the Nation." (MM-7)

Response: *The NRC believes that the description of the proposed action and the purpose and need of the proposed action, as presented in the SEIS, are accurately stated and reflect the scope of the NRC's jurisdiction and decision-making capability. The statement of the proposed action does not constrain the analysis of alternatives, and the NRC examines the impacts of a full spectrum of alternative sources of power to replace OCNGS generation should OCNGS cease operations upon completion of the 40-year license term. In addition, the SEIS examines the impacts of alternatives to the existing once-through cooling-water system should the NJPDES permit require changes to that system during the license renewal term. The description of the proposed action does not in any way restrict the decision-making authority of the State, other Federal agencies, and energy planners.*

NEPA is a procedural law and does not grant the NRC the authority to prevent or eliminate damage to the environment, but rather directs Federal agencies to assess the impact of an action on the environment, consider alternatives to the action, and propose mitigation of impacts. Prevention and elimination of environmental impact are the responsibilities of regulatory agencies charged with management and protection of specific resources. If the commenter is aware of flawed data or misrepresentation in the draft SEIS, those specific instances should be brought to the NRC staff's attention.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: The DEIS disregards the many known adverse affects and essentially parrots the information provided to the NRC by the applicant. As a result, the NRC has failed to take the requisite hard look at the proposed action. In addition, the DEIS perpetuates inaccuracies presented by the applicant with respect to the impact on the aquatic environment, going so far as to misrepresent the conclusions of studies cited. Not only does NRC misrepresent the studies cited, it fails to acknowledge the fact that the studies cited do not support the conclusion reached by the agency that the proposed action would have only a small impact on the environment. (MM-4)

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Response: *The SEIS and GEIS provide a thorough evaluation of the environmental consequences of OCNCS operations during the 20-year license renewal term. If the commenter believes that some adverse effects were not considered in the SEIS, these should be identified with more specificity. In conducting the environmental evaluation presented in the SEIS, the NRC uses information from a variety of sources, including the applicant's ER, data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. Included in the SEIS is an assessment of the environmental consequences of design-basis accidents and a site-specific consideration of SAMAs. The NRC's role in the environmental review process is to provide a fair and unbiased evaluation of the impacts of operations during the license renewal term. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: For the reasons articulated in this comment letter, NRC should not and cannot make any conclusions about either the risks of accident or terrorism associated with the proposed relicensing of the Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA. (BBB-14)

Response: *The SEIS provides a site-specific evaluation of SAMAs in Chapter 5 and Appendix G. Nevertheless, the comment raises concern that the GEIS and SEIS do not adequately evaluate the possible impacts of beyond-design-basis accidents initiated by terrorist attacks or sabotage. However, in the GEIS, the NRC staff did evaluate existing impact assessments performed by the NRC and by industry at 44 nuclear plants in the United States and concluded that the risk from beyond-design-basis accidents at existing nuclear power plants would be small. Additionally, compliance with the NRC regulatory requirements under 10 CFR Part 73 provides reasonable assurance that the risk from sabotage would be small. Even if such events were to occur, the Commission would expect that resultant core damage and radiological releases would be no worse than those expected from internally initiated events. Based on the above, the Commission concludes that the risk from beyond-design-basis accidents at existing nuclear power plants would be small, and, additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents. The text in Chapter 5 of the SEIS has been modified to provide the rationale for these conclusions.*

Comment: Why does the NRC depend [on] OCNCS for self monitoring when concerned taxpayers disagree because it is akin to asking the wolf to guard the chicken coop? The public and experts have questioned the monitoring and sampling programs and being self serving

and/or unscientific. Why not involve the National Academy of Sciences in the SEIS when it has the confidence of the US Congress was requested by elected officials? (KK-8)

Response: *As the applicant for license renewal and the holder of an operating license, AmerGen is responsible for collecting monitoring data. These data are submitted to State agencies and the NRC and are subjected to quality control checks. Much of the data submitted to the NRC by AmerGen is under oath or affirmation, and severe penalties can be assessed if data are falsified. In addition, the State has an independent radiological monitoring program that has shown results consistent with those developed by the licensee. In conducting the environmental evaluation presented in the SEIS, the NRC uses information from a variety of sources, including the applicant's ER, data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. No discrepancies in data or interpretation were found during this environmental evaluation. The NRC's role in the environmental review process is to provide a fair and unbiased evaluation of the impacts of operations during the license renewal term. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.2 Comments in Support of License Renewal at Oyster Creek Nuclear Generating Station

Comment: I'm just here to tell you that I believe that Oyster Creek should get a license extension. (L-1)

Comment: I can assure you our members, as well as management and security, are all highly trained, highly skilled professionals who take their responsibility seriously. Their first priority is to protect the public and the environment. They insure that Oyster Creek is a safe, clean, reliable, environmentally friendly plant, all day, every day. For all of these reasons and others, I urge you to relicense Oyster Creek. (M-6; S-8)

Comment: Our members are highly skilled and highly trained, as is everyone at Oyster Creek; union, management, and security. Each is a skilled professional in their field. I can assure you they all take their responsibility seriously and work hard to insure the safety of the public and the environment all day every day.

It's my belief that one of the great injustices in this whole relicensing process is that these dedicated professionals, along with the NRC and the State police are treated with contempt and referred to basically as incompetent by some of those who would like to see Oyster Creek and all nuclear plants closed. I'd like to take this opportunity to thank the NRC and the State police for their hard work and professionalism that they exhibit every day. Our members live and work in the local community. Their families live close to the plant, and their children go to school here. Our lives and those of our children and families, as well as the public we serve, would be

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affected by any problem at the plant. We would never compromise our principles for the safety of the plant or the public. (M-1; S-3)

Comment: So I do think it is a very important thing to look at the balance because if you do deny the Oyster Creek re-license, we have to look towards the future and look at the impact of what that's going to have in our environment. But I truly agree with the NRC's assessment, and I definitely believe that Oyster Creek is worthy of re-license. (W-6)

Comment: It looks like the operation as it appears to be the best way to go. We feel it's the best way to go. There's been extremely little impact on our environment with Oyster Creek. (R-3)

Comment: We have to take our best look at what we feel is best for the community and go with that, and I ask you to continue to do what you're doing. I think you're doing a great job. (R-4)

Comment: Oyster Creek is run by a team of dedicated and talented professionals who are just as committed as I am to protect the public, protect the environment, and protect the plant. We're looking forward to continue to operate and provide clean, safe, and reliable power to New Jersey until 2029. (Z-5)

Comment: I'm impressed with the people here at Oyster Creek. They try to do the right thing all of the time. It's a good, little plant. It's robust, a good design. It's simple, a great little unit. I'm really pleased with it. You know, I wouldn't have chose to live so close to it if I had any concerns about it. (AA-1)

Comment: I want to applaud the NRC for the work they're doing. As a very close resident to the plant, I'm very interested in it getting done right and being thorough about how you do it because my friends, neighbors, wife and family, we want to continue to feel safe being close to the plant. (AA-3)

Comment: Approve it I live by the plant and feel safe. I am tired of people from out of our town complaining. Approve the extension PLEASE!!! (DD-1)

Comment: I whole Heartedly support the relicensing of this facility. (LL-1)

Comment: The employees and the management staff are committed to safety as I could see as an outside professional in Occupational Safety and Health, during that 15 week operation to enhance security at Oyster Creek, under Home Land Security operations. (LL-2)

Comment: Those FEW who oppose the relicensing have not shown anyone any valid concerns other than false fear tactics. The plant is 40 years old come 2009, but that doesn't mean we can't have it safe with constant up grading. If the containment vessle is sound which is

your job at NRC to ascertain, then the plant should remain "ON LINE". It's puzzling to me and many of my friends and Neighbors that these groups opposing the license renewal seem to get a loud voice in the press and at various meetings, but really, who do they really represent but a very small minority of our population in Ocean County and the region.

I ran my own survey these last few months speaking to many around the region, and when I asked: do you know of the Mothers, Grandmothers, Nuclear Opponents, etc etc... NOT ONE PERSON IN AS MANY AS 60 OR SO, SAID THEY REPRESENT THEM IN ANY WAY OR EVEN KNEW OF THESE FOLKS. (LL-3)

Comment: Let's do what's right for the people overall and think positive about Nuclear Power. The President himself has taken a position to expand Nuclear Generation of Power. Jon Corzine also was reported in the press, to have some concern of the plants age, but said that's not a reason to shut it down. (LL-4)

Comment: The members of IBEW local 1289 are at the plant 24 hours a day 7 days a week. We don't see old data. We see data that is happening right now every day. And I can tell you that the plant is run safe, and we are committed to making sure it continues to run safe.

I live in Barnegat, which is less than five miles away from Oyster Creek. My wife and my children are within five miles of the plant. So are my parents. So is my brother. And I would never compromise their safety to see the power plant continue to run.

My expertise is in radiation protection, and I can tell you that Oyster Creek is a safe plant, both radiologically and as far as the environmental is concerned.

We have the operators and the radiation protection technicians, the mechanics, who are highly trained individuals who care, first of all, about the operation of the plant and the safety of the public and the safety of our families. (L-2)

Comment: At Oyster Creek our most critical systems are not those that produce power and make us money. They're the safety systems that we would use to protect the public in the unlikely and unfortunate event of an accident. A large portion of our resources and time is spent monitoring and maintaining these systems, as well as making sure that we meet all regulatory requirements associated with these systems. (Z-1)

Comment: My third concern is around protecting plant equipment. As an engineer, I interface with plant operators, maintenance personnel, chemists and others to make sure that each system and significant component is operating as it should. By monitoring and maintaining the equipment effectively, we can insure clean, safe, and reliable operation of the plant. (Z-4)

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Response: *The comments are supportive of license renewal at OCNCS and are general in nature. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

A.2.3 General Comments in Opposition to License Renewal at Oyster Creek Nuclear Generating Station

Comment: I am definitely opposed to the relicensing of Oyster Creek (D-1)

Comment: I just close by saying that I am very disappointed, more than disappointed. I feel that they are marketing a bill of goods that is detrimental to our welfare here in Ocean County and the State of New Jersey. (D-9)

Comment: In light of the seriousness of the risks associated with on-site spent fuel storage, increased potential for accidents at aging reactors, vulnerability and overcrowding of spent fuel pools, and the region's ability to economically replace the power generated by the plant, OCNCS should not be re-licensed. (EE-2)

Comment: For all of the above reasons, COA [Clean Ocean Action] and ALS [American Littoral Society] submit that the Draft GEIS fails to take a "hard look" at many of the environmental impacts caused by OCNCS and its antiquated once-through cooling system. It is a matter of public record that OCNCS creates significant, adverse and detrimental impacts to the Barnegat Bay ecosystem, including the death of trillions of fish and aquatic organisms each year. Without current data to establish the sustainability of various local species despite this momentous threat, the Draft GEIS' classification of these impacts as SMALL is scientifically flawed and without basis. Moreover, the Draft GEIS fails to reasonably evaluate closed-cycle cooling as an alternative to the destructive once-through system. For these reasons, COA and ALS urge the NRC to deny the OCNCS' application for re-licensing. (GG-24)

Comment: NRC should not and cannot make any conclusions about either the environmental impact associated with the proposed relicensing of the Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA. (MM-6)

Comment: My wife and I want to voice our concerns and objections to the relicensing of the nuclear power plant in Lacey Township, NJ. We have read about the issues from both sides and remain convinced that the management is not doing enough to protect the environment and public safety. (NN-1)

Comment: Please DO NOT relicense this 35 year old plant which is the oldest in the country (with still 5 years to go.) (TT-1)

Comment: Please think safe, don't relicense the Oyster Creek Nuclear Plant. (TT-4)

Comment: Island Heights and especially Moorestown, Riverside also, in fact, much of New Jersey is facing a horrible and increasing risk from some nuclear science and engineering issues related to Oyster Creek. (C-1)

Comment: The comment I am going to make now has to do with something that happened up in Boston very recently, but I think it's apropos. A tunnel was closed up there just a couple of days ago when a huge panel fell off the roof and crushed a woman in her car driving through. They closed up the tunnel. But what I feel is apropos is that the head of the Port Authority I don't know his name offhand, but he's the head of it there -- after the woman is dead, crushed to death, the tunnel is closed, he says to the press and the public, "Well, I want to assure everybody the tunnels are safe," you know, somehow that he could say that after, "Oh, my God," they had to close up the tunnel and the woman is crushed to death in her car and he says, "Don't worry about it, people. The tunnel is safe." (J-3)

Comment: Anybody who thinks that a nuclear plant is 100 percent safe is simply joking with themselves. They're not 100 percent safe. They're darn near 100 percent safe, and worst-case scenarios are certainly worst-case scenarios, and we don't want to be doomsdayers (phonetic) and stuff and say the end of the world is coming, but a friend of my was saying just the other day, "The juice just ain't worth the squeeze." Okay? (Y-3)

Comment: In the '60s and '70s, I was an engineer working on naval and utility nuclear power plant design projects. The Three Mile Island incident happened while I was working at Burns and Roe in Oradell, New Jersey.

The reactor containment building, which I believe saved the populous from a deadly radioactive release, was designed by a Burns and Roe engineer named Bob Palm, whom I work closely with.

The TMI incident itself was essentially caused by -- and this is a technical term -- cover-my-ass plant management. An operator moves to first operate the plant with a broken steam generator backup feed pump, then to turn off emergency core cooling after the reactor overheated due to failure of the main feed pump. The TMI event caused the demise of the U.S. nuclear power plant industry for quite a while. (C-2)

Comment: What happened in Chernobyl pretty much destroyed the Soviet Union. You can pretend you're blind to that or ignore it in any way you want, but it is simply ridiculous. Okay? A very real thing happened over there. (Y-2)

Response: *The comments oppose license renewal at OCNGS and are general in nature. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

A.2.4 Comments Concerning Surface-Water Quality, Hydrology, and Use Issues

Comment: Figure 2-3 on page 2-4. It's the Oyster Creek Nuclear Generating Station site property map. If you would just take a look at it? You will note that both Oyster Creek and the South Branch of Forked River west of the plant are delineated with dotted lines. Well, I'll tell you what I did. I checked the USGS map plot and brought a copy of it here today. You can clearly see that both Oyster Creek and the south branch of Forked River on USGS quad map are solid blue lines. That may not seem significant, but to an ichthyologist or people that use USGS maps as reference material, the dotted line indicates according to USGS legend an intermittent stream and one that does not carry constant flow of water. At best, this map to me is misleading.

I also noted that this map I guess was widely distributed and used for submission to other agencies to solicit comments. I'll leave it to the NRC to develop some sort of standards of integrity when it comes to using this sort of information. (A-1)

Comment: The site boundary map on page 2-4 uses dotted lines to delineate or to lay out the south branch of the Forked River and Oyster Creek. I compared that map to a USGS quad map, which is the standard map that's used for showing the location of a plant and the surrounding environment. The difference between the map in the report and the USGS quad map is that the USGS quad map shows those streams as being regular streams, not intermittent streams, as shown on the map that is included in the draft report. (A-2)

Comment: Figure 2-3 (OCNGS site boundary map), on page 2-4, delineates both Oyster Creek and the South Branch Forked River west of the Station with dotted lines. (Usually, dotted lines indicate watercourses of an intermittent nature). The USGS quad for the area delineates both streams with solid blue lines, well beyond the Garden State Parkway to the west. The NJDEP maps indicate that both streams are watershed of the Pinelands National Reserve. (CC-2)

Comment: It was also pointed out at this same hearing that the maps used in the draft report to identify the Oyster Creek and Forked River had inaccuracies relating to the designations of the Oyster Creek and the South Branch of Forked River waterways. (YY-2)

Response: *The comments point out that the map shown in Figure 2-3 uses dashed lines to indicate the upper reaches of Oyster Creek and the South Branch of Forked River (i.e., those portions upstream of the intake and discharge canals). The commenter correctly points out that dashed lines are conventionally used to indicate intermittent streams. Because neither the*

South Branch of Forked River nor Oyster Creek are intermittent in the area shown on the map, both streams are indicated as solid lines in the revised Figure 2-3 of the SEIS.

Comment: The next comment I have is on section 2.2.2. And that section is titled "Water Use...." "Information on the two production wells at Oyster Creek Nuclear Generating Station is available in a water use registration (NJDEP 2001A), which is required for users of less than 100,000 gallons per day." That statement is incorrect. The 100,000 gallons per day is a regulatory threshold. The installation of equipment, which could divert 100,000 gallons a day of the waters of the State of New Jersey or more requires a permit. That permit is, I believe, covered by the Water Supply Act and is typically referred to as a water allocation permit.

If you read on in that section, you will see that it refers to two production wells. If you run the numbers for those pump rates, you will see that they both exceed 100,000 gallons per day. That's why they're regulated.

This brings up a whole fascinating issue here. Then the section goes on and describes freshwater that's used in what's referred to as a fire pond. It does not describe the pumps or the capacity of those pumps that could be used to divert the water, the fresh water, from the fire pond. If those pumps have a capacity of diverting in excess of 100,000 gallons per day, my interpretation of New Jersey state law is that they would require a water allocation permit.

I'm not sure whether discovery is supposed to take place at these sorts of hearings, but I would like to bring this to your attention. Similarly, south branch of Forked River is a USGS quad, solid blue-delineated stream, solid blue-delineated going westerly beyond the Garden State Parkway. Its drainage area is significant. The entire flow of the south branch of the Forked River is diverted by operation of the cooling water pumps of the Oyster Creek Nuclear Generating Station.

I did a review of, I believe it is called, Appendix E, a listing of -- I believe there is a listing of permits and approvals that the station or the owner has provided. I find no permit issued for the fire pond water, which I believe is actually Oyster Creek water, another stream. I find no permit for the diversion of water from the south branch of Forked River.

I guess my question here -- oh, the other thing I wanted to mention, the section does mention that the wells have installed meters. And the way this usually works is that the applicant -- those are totalizing flow meters -- that the applicant takes readings and supplies those readings to the NJDEP on a periodic basis. And then the DEP sends the owner an invoice to pay a bill. I know you have used the terms "small," "moderate," "large." If you look at the millions of gallons, I think that we're talking here about diverted New Jersey state water. We may be able to get things large. (A-4)

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Comment: Section 2.2.2–Water Use. The statement regarding “less than 100,000 gallons per day” on lines 27 & 28, page 2-19, is incorrect. The 100,000 gpd is a regulatory threshold in accordance with N.J.A.C. 7:19-1.4 of the New Jersey Water Supply Allocation Rules. Also, Section 2.2.2. references NJDEP permits and metering for on-site water wells and is silent regarding the proposed continuous diversion of the entire South Branch Forked River fresh watershed (the product of a federal initiative). In my opinion, all water resources should be identified and quantified because the proposed action has direct impacts. (CC-4)

Response: *These comments refer to water permitting issues at OCNGS. The first issue mentioned concerns the pumping rates of the two production wells at OCNGS. As described in Section 2.2.2 of the SEIS, the average annual pumping rates of these two wells are 14 gallons per minute (gpm) and 4.1 gpm, or 20,000 gallons per day (gpd) and 5,900 gpd, respectively. The combined rates are well below the 100,000-gpd threshold identified by the State (NJDEP 2001). The State indicated that a Water Allocation Permit is required for the diversion of more than 100,000 gpd, not the installation of equipment of that capacity.*

The second issue is whether the fire pond requires a Water Allocation Permit. The State (reference below) calls for a Water Allocation Permit if the withdrawal of ground and/or surface water is in excess of 100,000 gallons of water per day for a period of more than 30 days in a consecutive 365-day period. Because fire pond pumping would not take place for more than 30 days, the Water Allocation Permit would not be required. See NJDEP 2006a.

The third issue is whether diversion permits are required for Oyster Creek and the South Branch of Forked River for use in the dilution pumping and circulating-water cooling system. This water usage is permitted under the CWA. By issuing a NJPDES permit, the State authorizes the use of intake water for the circulating-water pumps and the dilution pumps. Therefore, a Water Allocation Permit is not required. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: Page 2-19 fourth paragraph, indicates the two production wells on site have a water use registration for users of less than 100,000 gallons of water a day (gpd). On page 81 of the comments from the public hearing it is indicated that the statement was incorrect. The person making the comments indicated that it was the installation of equipment that could divert more than 100,000 gpd, which required a permit. A check of the water supply permits indicates that Amergen Energy Co. has a "Water Use Registration" 11108W. Water Use Registrations are for systems that have the potential to exceed the 100,000 gpd due to the size of the pumps or the number of wells in the system but their use is under 100,000 gpd on a 30-day average.

The last paragraph, of the same page, states over the year that the usage is only 14gpm. It seemed unusual to site usage in this way. On page 2-20, second sentence, they indicate that extraction wells for the ground water remediation are discussed in Section 2.2.3. Yet in Section 2.2.3 [t]here is no mention of the amount of water pumped by the ground water

extraction system. If ground water is being pumped for the clean-up technically, those amounts should [be] added into the plant Water Use Registration totals but there is no indication on the registration that there is any ground water pumping for a clean-up. If the 30-day average exceeded 100,000 gpd, then they would need a Water Allocation Permit.

It was not clear why the report made so much of the amount of water pumped at 14 gpm until page 4-43 was examined. There it is stated that "Plants using less than 100 gpm are not expected to cause any groundwater conflicts." The next paragraph indicates that as discussed in Section 2.2.2 the use is less than 100 gpm and "The NRC staff has not identified any new and significant information during its independent review of the AmerGen ER, the site visit, the scoping process, or the evaluation of other available information. Therefore, the NRC staff concludes that there would be no groundwater-use conflicts during the renewal term beyond those discussed in the GEIS." (PP-63)

Response: *These comments refer to water permitting issues at OCNGS. The first issue mentioned concerns the pumping rates of the two production wells at OCNGS. As described in Section 2.2.2 of the SEIS, the average annual pumping rates of these two wells are 14 gallons per minute (gpm) and 4.1 gpm, or 20,000 gallons per day (gpd) and 5,900 gpd, respectively. The combined rates are well below the 100,000-gpd threshold identified by the State (NJDEP 2001). The State indicated that a Water Allocation Permit is required for the diversion of more than 100,000 gpd, not the installation of equipment of that capacity.*

The second issue the commenter refers to is water used for groundwater remediation. The diesel remediation system pumps varying amounts of water. Data from 1997 to 2002 are presented in Jersey Central Power & Light Company (JCP&L) 2003. During this time, the months with the highest groundwater pumping by the system were January to June 1998. During this 6-month period, approximately 186,000 gallons were pumped, which is an average rate of 0.72 gpm or about 1036 gpd, well under the 100,000-gpd threshold limit. Other periods are significantly lower. The commenter's statement that the remediation system's withdrawals should be included in the Water Use Registration is true, and the facility should include this information in future permits with the State for completeness. However, relative to the cited Category 1 issue and its 100-gpm threshold, the remediation system pumping is a negligible additional amount relative to the average production well pumping of 14 gpm. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Section 4.5, Groundwater Use and Quality. This section indicates there are no groundwater-use conflicts, which seems to be based on the plant not pumping more than 100 gpm. Actually when the wells are pumping they each exceed the 100 gpm since they have 200+ gpm pumps. Also they cite "NJDEP 2005a" for pass-through cooling water for some pumps. This fact sheet on the discharge permits for the plant discusses some of water use for the plant. In the report, on a diagram of the water flows at the plant, the South Well is shown.

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For the South Well, it is indicated that the flows from the well can range from 3,000 to 103,700 gpd. The Draft GEIS does not show the North Well on the diagram. What also is not indicated there or in the report is the any amount of ground water pumped by the ground water clean-up system. Another ground water pumpage at the plant site, which possibly may be used by the plant, is under Water Allocation Permit 2164P. This permit is for Jersey Central Power & Light and has a maximum rate of 1,100 gpm and 7.95 million gallons per month. The first three wells listed on the permit are DW-1, DW-2 and SW-1 which were drilled for the Oyster Creek Nuclear Plant in 1971 and 1973 to supply water to the plant. These wells are still permitted in the latest diversion permit for JCP&L after the selling the plant to AmerGen even though they were for plant water supply. It is not clear why JCP&L would have kept them under their permit since it is likely they still are interconnected to the plant. We doubt the original piping was removed after the sale of the plant. Is or can water pumped under the Jersey Central Diversion be used by the AmerGen plant? If so, then the fact that AmerGen reports 14 gpm averaged out over the year is moot. They could be using and pumping significantly more water from the site since it would be reported under a different diversion. Also there is no quantity being pumped for the ground water clean up.

Based on previous records, at times the plant can and will use more water than the AmerGen Water Use Registration permits. The records show in the 1990's there was at least one time the plant exceeded its monthly diversion of 7.95 mgm. It is not clear why they used that much water, but if the same conditions occur again the plant would likely use similar amounts of water.

Section 4.8.5, page 4-55. The report again indicates that the plant water use of only 14 gpm is inconsequential and is well below the GEIS Category 2 threshold for ground water use of 100 gpm. Then at the bottom of the page they again state "... the NRC staff concludes that the cumulative impact on groundwater resources through water usage would be SMALL, and that additional mitigation would not be warranted." This statement cannot be evaluated until all the ground water pumpage and use at the plant quantified as discussed above under Section 4.5. (PP-65)

Response: *The comment suggests that the North and South Wells may be pumping more than 200 gpm when turned on. This assumes that the pumps have no controls to regulate the pump rate, and it assumes that the pumping takes place over a reasonably long period of time. There is no indication that the wells remove water at a rate more than 100 gpm. The NJPDES flow diagram that is described in the comment, for example, states that the South Well pumps 3000 to 103,700 gpd, which is 2 to 72 gpm. Data for the overall combined pump rate of the North and South Wells averages 14 gpm.*

The three JCP&L wells (DW-1, DW-2, and SW-1) that are cited in the comment were originally constructed as dewatering wells for the proposed but cancelled Forked River site. They remain

under current permit to JCP&L. AmerGen does not use their water and does not have access to them.

Concern was also raised about the pumping rate the groundwater remediation system. The diesel remediation system pumps varying amounts of water. Data from 1997 to 2002 are presented in Jersey Central Power & Light Company (JCP&L) 2003. During this time, the months with the highest groundwater pumping by the system were January to June 1998. During this 6-month period, approximately 186,000 gallons were pumped, which is an average rate of 0.72 gpm or about 1036 gpd, well under the 100,000-gpd threshold limit. Other periods are significantly lower. The commenter's statement that the remediation system's withdrawals should be included in the Water Use Registration is true, and the facility should include this information in future permits with the State for completeness. However, relative to the cited Category 1 issue and its 100-gpm threshold, the remediation system pumping is a negligible additional amount relative to the average production well pumping of 14 gpm. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Section 8.1.1.2, pages 8-14 & 8-15. The report indicates that during the construction of a closed-cycle cooling system the ground water usage would be negligible. They indicate that the water requirements, for potable water for the additional workers and for concrete was mixed on site, would be short and not exceed the existing registration. They also indicate that the underground parts of the construction would create a need for localized dewatering and require a permit.

First, during construction there is significantly more water use during construction than for potable water and for concrete. Significant amounts of water are used at construction sites for cleaning equipment as well as dust control. Also the construction would likely continue for months.

Second, the dewatering would require a diversion permit as the report indicates, but in aquifers like the Cape May and Cohansey (depending of the depth of any construction) the pumpage would be in the hundreds to thousands of gallons per minute. For the footing for the uncompleted Forked River Station the dewatering was pumping over 16,000 gpm. I do not know how deep the footings for cooling towers would have to go, but most likely they would be significantly below the water table. Also if there was any contaminated ground water in the area of construction most likely there would be some treatment and/or monitoring requirements attached to the permit. (PP-66)

Response: *The comment asserts that construction of a cooling-tower system would require large amounts of water for dust control and other needs, and that dewatering for foundation construction would require pumping at a rate of hundreds to thousands of gpm. Estimating the*

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amounts of water that would be withdrawn for construction of cooling towers is beyond the scope of this SEIS, but water uses would require permits from the State. Such withdrawals (e.g., for a concrete batch plant, dust control, and other construction-related usages, and dewatering for foundation construction) would be temporary. The NJDEP Water Supply Division is responsible for evaluating applications for water diversions, and its permit types for dewatering in excess of 100,000 gallons of water per day include a Temporary Dewatering Allocation Permit, or Dewatering Permit-by-Rule or Short Term Permit-by-Rule, depending on the duration of construction and the method employed. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: You know Barbara mentioned the tritium problem. That's only beginning the contamination of our groundwater by tritium. It happens to be able to spread very easily, and that hasn't even been considered. (D-7)

Comment: I wanted to ask the NRC, how is it that they missed that ten-year tritium leak? I think it was called Briarwood out in Pennsylvania. And nobody caught it. The NRC certainly didn't catch it. It was a neighbor who saw a pool forming on his land and had it checked and found out it was radioactive tritium. I'm just wondering why ten years when the NRC claims they're so thorough and they missed it. That's my first question. And I would like it answered. (J-1)

Response: *Monitoring for tritium takes place at the OCNGS, as described in Sections 2.2.3 and 2.2.7 of the SEIS, under the REMP. REMP reports include surface-water and groundwater sampling results. The monitoring results indicate that tritium has remained well below the 20,000-pCi/L threshold for drinking water quality established by the EPA. The commenter is referring to the Braidwood Nuclear Station in Illinois. See NRC 2006 for an explanation of the inadvertent release of tritium from the station discharge as well as an explanation of the likely consequences. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: NRC also incorrectly analyzes the applicability of the EPA's Phase II rules regarding cooling water intake structures. Finally, NRC unreasonably relies on the incorrect analysis forwarded by the New Jersey DEP in the draft NJPDES permit and incorporates those preliminary conclusions, conclusions that have been heavily criticized and not finalized, into the DEIS. (MM-5)

Response: *The comments on NRC's analysis of the applicability of EPA's Phase II regulations lacks specificity. The NRC has determined that EPA's Phase II regulations apply to OCNGS. The NRC cannot presume the outcome of the ongoing NJPDES permitting process which addresses the Phase II requirements, and, therefore, has incorporated information from the*

draft permit in the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Page 2-22, lines 10-16. The following statement appears, "Dredging of Oyster Creek and the Forked River is administered by the U.S. Army Corps of Engineers (USACE) and a Coastal Area Facility Review under the New Jersey Coastal Zone Management Act. Suction dredging has been performed to minimize the impact of the dredging, and dredged materials have been conveyed to the dredge spoils basin (Figure 2-3) using hard piping. During the license renewal period, periodic dredging may take place in the intake and discharge canals, the Forked River, or Oyster Creek. The dredging would be consistent with past techniques and requirements."

Please be advised the permit required for dredging from the NJDEP would be a Waterfront Development Permit under New Jersey's Waterfront Development Law and not a Coastal Area Facility Review Act (CAFRA) Permit. (PP-67)

Response: *The text in Section 2.2.3 has been revised as suggested.*

Comment: Why is the creation of the 1963 dam created for fire water storage not factored into the 1974 FES? Based on references in the DEIS, it is only discussed in a NJDEP 2005a report. (2-19) (MM-20)

Response: *The fire pond is discussed in Section 3.3 of the Final Environmental Statement (FES). The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Why did NRC stop its review of water quantity issues at 2000? (2-20) Paper records are available from the NJDEP prior to 2000 and should be reviewed for purposes of determining impacts. (MM-21)

Comment: With respect to water quality, NRC did not appear (2-21) to review data prior to 2000. What is the justification for this? (MM-23)

Response: *The purpose of reviewing historical records is to predict water quantity and quality issues during the license renewal period. Review of reports from 2000 to present, together with review of the site's historical data as presented in the Industrial Site Recovery Act (ISRA) reports published in 2000, provided an adequate basis to evaluate current water quantity and quality issues at OCNGS. Over the life of the station, there have been numerous upgrades to the radiological effluent release systems, and changes in regulations. The NRC staff considers the past five years of data indicative of future water quantity and quality issues during the license renewal period. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

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Comment: 2.2.3. Water Quality. The existence of a permit does not mean there is no impact to the environment. The benefit of NEPA is that it allows a decision maker to review cumulative impacts, whereas individual, departmental regulators often do not have the ability to make those cumulative impact determinations. In addition, the Facility does not have a perfect compliance record, which should affect the discussion of impacts. Indeed, the NJDEP fined the Facility \$35,000 for violating its permit and causing a fish kill in January 2006. Moreover, the January 2006 incident was not the first instance of fish kills caused by the Facility. (MM-22)

Response: *Although valid permits do not guarantee that environmental impacts will not occur, permits provide regular checks of compliance and generally consider the environmental context of the facility. These permits, and associated monitoring, are an important means of protecting the environment. Past violations at OCNGS, including fish kills, are fully discussed in the SEIS. Cumulative impacts of OCNGS operations are discussed in Section 4.8 of the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: There are more than 100 areas of concern (2-22) at the Facility. Where does NRC consider the past impacts that led to contamination at over 100 places at the Facility with respect to whether an additional 20 years of operation will have an impact on the environment? (MM-24)

Response: *An Area of Concern (AOC) is a potential source of contamination and is not necessarily an actual source. These AOCs are the result of historical events and are being dealt with under an existing program triggered by the sale of OCNGS to AmerGen. As described in Section 2.2.3, most of the more than 100 AOCs were investigated, and no further action was recommended. Conditions at the remaining AOCs are ongoing and described in the text. License renewal is not expected to affect these ongoing activities. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The DEIS reveals that the confined aquifer containment was breached when the reactor was constructed. A 1986 tank spill led to contamination of the aquifer. Groundwater is primary source of drinking water in this area of NJ. Where does NRC consider future impacts to groundwater, in the face of growing water shortages and increased water demand, based on past harm? (MM-25)

Response: *As described in Section 2.2.3, the diesel fuel spill is being addressed with a remediation system, with involvement of the New Jersey Bureau of Environmental Evaluation, Cleanup, and Responsibility Assessment and a necessary permit from the county. These actions are being taken to prevent contamination of the Cohansey Formation. Cumulative impacts on groundwater resources are discussed in Section 4.8.5 of the SEIS. The comment*

provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Why is there no discussion of the conflicts associated with the Facility's use of Forked River and Oyster Creek and other uses by the public or by wildlife? (MM-54)

Response: *Water use conflicts are discussed in Section 4.1 of the SEIS. As stated in Section 4.2.1.3 of the GEIS, "these conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems." During the original licensing of the facility, the decision was made to significantly alter the lower reaches of both Oyster Creek and Forked River. That decision was made with the understanding that there would be conflicts with wildlife, but that these impacts would be restricted to the lower portions of these two streams. Because of their localized nature, the GEIS concluded that these impacts would be SMALL. During the NRC staff's review of OCNCS, no new and significant information was identified to suggest that there would be impacts during the license renewal term beyond those discussed in the GEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.5 Concerning Aquatic Ecology, Terrestrial Ecology, General Ecology, and Threatened and Endangered Species Issues

Aquatic Ecology

Comment: Then we have the idea of Barnegat Bay corruption. Now, that was addressed by Professor Kennish. And there's really nothing I could add. He's an expert. But the point is that the NRC relies on data 30 years old. That's unacceptable. And this is what we are supposed to swallow as the public. (D-4)

Comment: You have to do population studies and community studies in the estuary. If you don't do that, the information is of no value. It's essentially no value. In fact, the power plant, it would be my recommendation that they do it because if you just look at impingement and entrainment data at the power plant, those numbers indicate that you have an absolute number of organisms that are dying because of the plant. They're very large.

And so someone would say, "Well, my God. You have all these organisms dying." Well, you really need to take a study of the bay population and because those numbers may really not be translating into a real impact, as has been said by Mike and so on and his colleagues. So it would be to their advantage to do a population survey in the bay because if it can be demonstrated that the adult populations out there are not really being adversely affected, then you have something. But to play this guessing game or not really wanting to do population surveys out there and just using these numbers at the plant, it actually makes it look even worse because it looks like these are an absolute number of organisms that are dying, you know, a

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quarter of a million blue crabs a year at the intake screens, for example. What does that mean in terms of the total population of crabs in the bay? Maybe it's one percent. But for a crab potter out there who says, "Oh, my God, 250,000?" the guy is going to go bonkers, you know.

So we really need to really do things correctly, do it scientifically sound. That is not being done right now. And, again, I'm willing. I'm offering my services to help out, help out the company and help out the DEP and EPA. Part of the problem is the EPA itself has rescinded some of its obligations in terms of not enforcing or having the power companies do population surveys.

So the companies themselves seem to respond mostly to pressure from outside the government agencies. They respond to pressure from a government agency. They're not doing things on their own volition in my opinion. If you go back into time, the response mainly is to a response to some requirement and after a permit violation or whatever, rather than someone taking the proactive position ahead of time to do something about it so that you remediate the problem before it even occurs. (I-3)

Comment: The amount of aquatic life that is being pulled in there is horrendous. The fact that they are basing this on information from 1978 and not current levels, I personally am aware of the oyster beds that have seemed to have disappeared from Barnegat Bay. I am also aware of the declining blowfish numbers in Oyster Creek. I am also aware of the very recent studies that have been done and work that has been done out of Rutgers on actually the environmental quality of the bay and the degradation that's happened to the bay.

And I think that this is the data that we really should be looking at, current studies, and if the NRC is planning on relicensing this plant for 20 years, then they need to go out in the bay and they need to look at the bay and they need to have real data, current data so that they really know exactly what kind of an environmental impact Oyster Creek has had on the bay and the making a realistic environmental impact statement, not making assumptions from 1978. This is not good science. (O-12)

Comment: It is totally preposterous with all that is known about impingement, entrainment, and thermal pollution to say that it is minimal impact or negligible. It is just absurd. (T-1)

Comment: The Draft GEIS concludes that the impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems are SMALL. We strongly disagree with this conclusion and the manner in which it was reached. The determinations on these Category 2 issues were made based on the staff's evaluation of three assessments: 1) The EA [EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland] (1986) 316(a) and (b) demonstration, 2) Summers et al. (1989) [Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek

Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection] Review ("the Versar Report") and 3) OCNGS NJPDES DRAFT permit and fact sheet ("Draft NJPDES Permit") from New Jersey Department of Environmental Protection ("NJDEP") [New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet]. It is important to note that these three documents cannot be considered different sources of information, as both documents 2 and 3 are reviews (not original research) that rely heavily on the flawed data presented in 1. The conclusions of SMALL are fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay Estuary since these data were collected and lack of analysis on cumulative impacts. (GG-3)

Comment: The only original data used by the NRC (EA [EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland] and JCPL [JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey]) to draw the conclusions that the OCNGS has a SMALL impact on fish and shellfish was found to be scientifically flawed and deficient by many different scientists and analysts, including the Versar Report. (GG-4)

Comment: The NRC [Generic Environmental Impact Statement for License Renewal of Nuclear Plans, Supplement 28 Regarding Oyster Creek Nuclear Generating Station, Draft Report for Comments US Nuclear Regulatory Commission, NUREG-1437, Pages 4-10 through 4-25] lists many of the deficiencies and problems of these studies, some of which are detailed in this Section A, but fails to address them or provide any explanation why these data are still being utilized. To the contrary, the NRC continues to cite the conclusions made in these studies. In addition, these limited data are over 20 years old (data from 1975-1978 [JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey] and 1985 [EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland]) and there have been significant ecological changes in the Barnegat Bay Estuary since that time. (GG-5)

Comment: The Draft GEIS accepts several conclusions of the Versar Report that are no longer valid based on current knowledge and understanding of natural aquatic systems in the Barnegat Bay estuary. Some of these invalid conclusions are set forth below together with our corresponding comments (in italics).

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- "There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource." (Page 4-15) *There have been no Bay population surveys conducted over the past 30 years that would allow such a conclusion to be reached.* NRC readily acknowledges this dearth of information in Section 2.2.5.3, which states that there are no recent population abundance data for 12 of the 14 species listed. The information provided on the remaining two species (blue crab and hard clams) are based on fisheries data, which is not an accurate or appropriate assessment of entire Bay-wide populations;
- "Continued operation of OCNGS at the estimated levels of losses to representative important species populations, without modification to intake structures and/or operating practices, does not threaten the protection and propagation of balanced, indigenous populations." (Page 4-21) *As stated above, without recent population data from Barnegat Bay, the impact of the OCNGS on aquatic populations in the bay cannot be determined;*
- Population losses (for grass shrimp) will be rapidly compensated for by reproduction (Page 4-15). Both the EPA [Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624] and the California Energy Commission [Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005] came to separate conclusions that compensation does not reduce impacts from entrainment and impingement on adult populations and in fact, a population's natural compensatory ability may be compromised by impingement and entrainment losses in conjunction with all the other stressors encountered within a population's natural range;
- Blue crab and winter flounder losses caused by OCNGS represent "a small fraction of the Barnegat Bay population" of those species (Page 4-15). Without current population data on the aquatic organisms in the Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is without support and is no longer valid. This assertion is supported by the testimony of Dr. Michael Kennish at the July 12, 2006 GEIS public hearing, as well as in his written comments submitted to NRC on the GEIS (August 30, 2006). In his written comments, Dr. Kennish states:

"The lack of bay surveys during the past three decades, therefore, undermines the fundamental conclusions of the GEIS with regard to minimal impacts of impingement and entrainment of the OCNGS on aquatic populations in the bay";
- Losses of bay anchovy and opossum shrimp "have little effect on higher trophic levels" (Page 4-15). Without current community dynamics data for Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is also

without support and is no longer valid. Again, our assertion is supported by the testimony and comments of Dr. Michael Kennish. In his written comments, Dr. Kennish states:

"the GEIS assessment of cooling system impacts on the aquatic ecology of the bay cannot be accurate because population surveys in the bay have not been conducted concurrently with impingement and entrainment sampling at the OCNGS since 1977. Consequently, the conclusions of the GEIS regarding OCNGS impacts on aquatic communities in Barnegat Bay are invalid and irrelevant".

In reviewing the veracity of these conclusions stated in the Draft GEIS, it is important to bear in mind that *the only available bay-wide benthic and fisheries survey studies of Barnegat Bay were conducted in the 1970s. As recognized in the Versar Report, these studies are "of limited value for assessing power plant effects* [Pages IV-19, 27, 66. Page IV-51]. Some of the deficiencies in these studies are detailed in Section A.2 above. (GG-12)

Comment: The lack of available current data on important fish and shellfish in the Barnegat Bay, as noted throughout this section, further illustrates the deficiencies of the Draft GEIS and the validity of the conclusion stated therein that continued operations of OCNGS will only result in SMALL impacts on important aquatic resources of the Bay. (GG-13)

Comment: Our first and foremost concern is with the draft SEIS's use of outdated data and the lack of a complete evaluation of the environmental effects from the continued operation of the facility. While other regulations may not require the regular collection of data and information, these in no way influence the NEPA requirement to collect data to accurately and appropriately analyze, evaluate, and disclose the impacts from a proposed action. For example, a serious shortcoming of the document is that it relies upon 20 to 30 year old aquatic resource data to inform the public and decision makers regarding the facility's impacts for the next 20 years to come. Rather than relying on nearly 20 year old data from other studies, the draft SEIS should have evaluated the present and continued effects from altered water quality, temperatures, currents, as well as entrainment and impingement, and put that evaluation in the context of the effects not only on Oyster Creek and the South Branch of the Forked River, but on the larger Forked River and the Barnegat Bay ecosystem. (HH-4)

Comment: The draft SEIS also did not have a sufficient or current evaluation of the facility's effects on species that are residents of the area (i.e., the discharge canal and Oyster creek) around the facility, such as hard clam, blue crab, American eel, and herring and the important aquatic habitat. (HH-5)

Comment: First, the impingement and entrainment losses documented over the years by AmerGen are virtually meaningless in the absence of Bay population surveys and associated population databases collected over the past 30 years against which the Facility-based losses can be compared. Without that basis for comparison, both NRC and AmerGen are unable to

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arrive at any conclusions about the affect the Facility is having on the environment. Nowhere is this made more apparent than is section 2.2.5.3 of the DEIS. For virtually all of the species selected by NRC to discussion, the DEIS states that there are no population abundance data or trends. Professor Michael Kennish also points out this flaw in the DEIS in his testimony on July 12, 2006. Without this information, NRC and the Facility cannot determine the true impact of the Facility on aquatic communities in the bay. The only defensible assessment of the Facility's affect on Bay populations took place in the late 1970s, when the last population samples were collected in the Bay concurrently with impingement and entrainment samples. This assessment was made as part of the Facility's required Clean Water Act Section 316 Demonstration, and itself has flaws that are documented in the attached comment letter, which letter is incorporated herein and is to be made part of the record.

In the case of the DEIS, not only has NRC relied on old and incomplete data, it completely fails to take into account the tremendous natural variation in the abundance of aquatic organisms in the Bay, as well as the natural variation in those organisms impinged and entrained by the Facility. Professor Kennish has noted that this natural variation can exceed 200-300% annually. See Kennish July 12,2006 Testimony at 72:l-5.

To rectify the information deficit, and thereby allowing any regulator to arrive at defensible conclusions as to the impact the Facility is having on the environment, population surveys in the Bay should be conducted annually, or at least every five years, together with impingement and entrainment sampling. Id. In the absence of this information, the assessment of the cooling water intalce system affects on the environment, as described in Section 4.1 of the DEIS are simply inaccurate. Therefore, NRC's conclusions in the DEIS regarding the Facility's impacts on aquatic communities in Barnegat Bay are invalid.

There are several, particular statements and conclusions by NRC that are questionable, at best. In each case, NRC is attempting to minimize the affects of entrainment and impingement of aquatic organisms. For example, in Section 4.1.1 (page 4-15), NRC states: "There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource." However, for the reasons articulated in the preceding paragraph regarding the absence of Bay population surveys, this statement is unfounded and incorrect. This statement is particularly problematic in the NRC is purported to extrapolate from the current situation and make conclusions about what is likely to happen in the future. NRC cannot point to any data or studies cited in the DEIS that support this statement.

Not only can NRC not point to any data that supports those conclusions, the data we do have for at least two of the Representative Important Species identified in the Section 3 6 Demonstration, the hard clam (*Mercenaria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*), evidences a dramatic decline in those populations in the Bay. In another example, NRC comes to the same faulty conclusion on page 4-21 of the DEIS:

"There is no evidence to suggest that past, current, or future impingement of these species would destabilize or noticeably alter any important attribute of the resource." Thus, NRC cannot support its conclusions in the DEIS with respect to the impingement and entrainment effects on the Facility without data from Bay surveys conducted during the past three decades.

In what could possibly be described as NRC's failure to rigorously review the information provided to it by the applicant, NRC misrepresents a statement made by Professor Kennish in one of his published articles on the Barnegat Bay-Little Egg Harbor Estuary. Professor Kennish's work is misrepresented three times in the DEIS-and it is done in such a way so as to support NRC's conclusion that the Facility is not having a significant impact on aquatic populations in Barnegat Bay. The error occurs on pages 4-15,4-21, and 4-5 1 and includes statements taken directly from Kennish, M. J. 2001. State of the Estuary and Watershed: An Overview. Journal of Coastal Research, Special Issue 32, pp. 243-273. As Professor Kennish pointed out in his July 16,2006 testimony, the cited work is a review of earlier studies conducted on Bay populations. Professor Kennish's conclusions as to the affect the Facility is having on the Bay are valid only with respect to the two-year period from 1975-1977. These conclusions are not valid as to the entire operating period of the Facility and cannot be cited for that proposition.

In what appears to be yet another example of an incomplete review by NRC staff of the information provided by the applicant, NRC suggests in the DEIS that there are a number of studies reviewed by NRC that do not contradict NRC's findings with respect to the affect of the Facility on the aquatic populations in the Bay. First, it is irrelevant whether recent studies do not contradict NRC's findings-as the lack of a contradiction should not be construed in any way as support. Second, and more troubling, is that few studies have been published recently (the past 20-30 years) in peer-reviewed journals that deal with the Facility's impact on aquatic. NRC fails to cite to these studies, and thus the public is unable to discern whether NRC even reviewed those studies, let alone comment meaningfully on the NRC's conclusions. (MM-9)

Comment: On page 4-12 at line 27, the DEIS cites estimates based on 1975-76 numbers, but populations fluctuate (see testimony of Michael Kennish, Ph.D.). The entrainment was measured at the discharge canal, but there were no corresponding studies in the Bay. This problem, coupled with the possible underestimation in the original study (4-12, line 27), calls into question this conclusion. On page 4-14, NRC only evaluated the conclusions drawn by others, but did not do any independent assessment; therefore, all of the flaws in the original data or those studies have become part of the DEIS. The DEIS states that there are no obvious changes in communities in the Bay, but the data collection stopped in 1981. How can NRC justify or support this conclusion? The DEIS references the fact that the applicant has recently resumed intake sampling again in 2005. However, this is not adequate for concluding that the impact is small and is meaningless without comprehensive data about the populations in the Bay. On page 4-15 (lines 34-38), the NRC misrepresents Michael Kennish's conclusions. (MM-58)

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Comment: 4.1.2 Fish/shellfish entrainment. Which articles support these conclusions? The DEIS fails to cite any authority. NRC fails to discuss how the problems with impingement number estimates affect its conclusions as to impacts. Professor Kennish is misrepresented on page 4-21 (lines 36-38). (MM-59)

Comment: See comments to NJPDES draft permit^(a) for a thorough critique of the thermal discharge from the Facility. (MM-60)

Comment: How can NRC conclude that there are only minor effects in Barnegat Bay (4-48) when the DEIS, and all of the data submitted by the applicant to NRC is riddled with errors, flaws, and the significant omissions highlighted earlier in this comment letter? There are no baseline studies and no population numbers; therefore, NRC cannot reach this conclusion. (MM-65)

Comment: There have been no continuous studies to monitor the Bay populations. These studies could and should have been done. Updates performed now cannot be the basis for a determination that there are no cumulative impacts. The ecosystem was destroyed. NRC is unable to substantiate the conclusion that the impacts are localized (4-50). There is no question that the amount of freshwater that reaches the Bay has changed and will continue to be affected as long as the license is in place. The volume of freshwater that enters this system is critical, in light of the fact that this is a system that does not flush frequently. (MM-66)

Comment: While there may be insufficient evidence to definitively prove that the operation of the Facility's cooling system is altering the ecosystem, there is no evidence whatsoever to suggest that the Facility's archaic once through cooling system is not having a large impact on the ecosystem. Taken at face value -the volume of water used, the impingement and entrainment data, the increasing takes of sea turtles, and the crash of fish stocks, the Facility is having an impact. NRC cannot arrive at any conclusions without data about the Bay populations. With respect to comments on the RIS (4-52), please see the attached NJPDES comment letter. (MM-67)

Comment: Section 4.1 (Environmental Impacts of Operation: Cooling System) of the Generic Environmental Impact Statement (GEIS) regarding the license renewal for the Oyster Creek Nuclear Generating Station (OCNGS) has several major flaws that invalidate its overall conclusions on aquatic ecological effects. Of particular note is the lack of bay population surveys and associated population databases collected during the past 30 years to compare against impingement and entrainment losses of organisms at the OCNGS. Bay population surveys and impingement and entrainment sampling must be conducted concurrently. Without

(a) Comments on the NJPDES permit referred to in the comment are not included in the SEIS. They are available for download from NRC's ADAMS website at <http://www.nrc.gov/reading-rm/adams/web-based.html> under accession number ML062610416.

these databases – notably recent databases there is no way to accurately determine the true impact of the OCNGS on aquatic communities in the bay. The only valid assessment of OCNGS impacts on aquatic populations in Barnegat Bay was conducted during the 1975-1977 period when the last population samples were collected in the bay concurrently with impingement and entrainment samples. The results were reported in the OCNGS 316(a) and(b) Demonstration Report. (OO-1)

Comment: In addition to relying on old and incomplete data collected 30 years ago, the NRC has failed to take into account the large natural variation in abundance of organisms in the bay, as well as the variation of organisms impinged and entrained at the OCNGS, which can exceed 100-300% annually. Ideally, therefore, population surveys in the bay should be conducted annually, or at least every five years, together with impingement and entrainment sampling. Let me reiterate, the GEIS assessment of cooling system impacts on the aquatic ecology of the bay (Section 4.1) cannot be accurate because population surveys in the bay have not been conducted concurrently with impingement and entrainment sampling at the OCNGS since 1977. Consequently, the conclusions of the GEIS regarding OCNGS impacts on aquatic communities in Barnegat Bay are invalid and irrelevant. (OO-2)

Comment: On page 4-15 the statement is made that, “There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource.” Because no population surveys have been conducted since the 1975-1977 period, there is no way this statement can be correct, especially with regard to current losses and probably future losses as well. It certainly cannot be substantiated by the deficient databases that now exist. (OO-3)

Comment: The GEIS also infers that more recent findings from an extensive review of available published information (academic journals or other sources) by the NRC staff did not contradict the agency’s finding of no significant OCNGS impacts on aquatic populations in the bay. However, there have been few studies published in peer-reviewed journals which deal with OCNGS biotic impacts in any form during the past two or three decades. It is incumbent on the NRC, therefore, to document and list for public examination the published academic journal articles that it notes support the findings of the GEIS regarding the lack of significant biotic impacts of the OCNGS. The NRC should not only list the titles of the published articles but also the journal names and authors, and the relevant page numbers. I have already indicated that my publications relevant to this issue are review articles addressing findings of the 316(a) and (b) Demonstration published nearly 30 years ago. (OO-6)

Comment: At the July 12, 2006 public hearing Professor Michael Kennish, a research professor at Rutgers University and an acknowledged authority on the ecology of Barnegat Bay, pointed out that no recent data on the cumulative effect by Oyster Creek on Barnegat Bay had been provided to the NRC. He also emphasized that the studies used by the NRC to evaluate the current situation were at least 30 years old, and though they were relevant at that time, they

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no longer gave a reasonable basis on which to assess the current status of Barnegat Bay. The League is deeply concerned not only about the lack of relevant viable data, but about the NRC's lack of insistence on obtaining this critical information. (YY-1)

Comment: Please provide the League with the NRC's reasons behind the decisions to use the obsolete 1970 data and the use of inaccurate maps. We would like your thoughts on how results based on incorrect information can be anything but incorrect. (YY-3)

Response: *These comments express concern that the effects of the OCNGS once-through cooling system as presented in the SEIS are underestimated, and that the data available to evaluate the impacts of OCNGS operations on aquatic resources are dated and do not necessarily reflect current impacts. Many of these comments are assertive without any data to support the conclusions that impingement and entrainment significantly affect the bay-wide populations. Nevertheless, the staff reconsidered its conclusion and revised Sections 4.1.1 and 4.1.2 of the SEIS stating that the operation of OCNGS has resulted in localized impacts that are largely confined to near-field locations that include Forked River, Oyster Creek, and portions of Barnegat Bay adjacent to these areas. This finding is consistent with Section 4.2.1.2.1 of the GEIS, which states that these impacts are unavoidable for plants that utilize a once-through cooling system design. The revised assessment presented in the SEIS acknowledges that because there are no recent monitoring data, the conditions that existed during the original 316(a) and 316(b) studies may or may not exist today. The revised SEIS acknowledges the uncertainty resulting from the lack of recent monitoring data. Neither NEPA nor the CFR requires NRC to collect data for analysis; however, the NRC staff recommends that any future monitoring studies should be designed to evaluate multiple environmental stressors (both anthropogenic and natural) at spatial and temporal scales sufficient to address the inherent variability within the system.*

In preparing the SEIS, the NRC staff attempted to review all pertinent information, including peer-reviewed scientific literature, technical reports, books, and web-based information on Barnegat Bay. The citation lists in Chapters 2 and 4 reflect the breadth of the investigation and include technical documents published by the Barnegat Bay National Estuary Program, the 2001 Journal of Coastal Research, Special Issue 32 on Barnegat Bay, and Ecology of Barnegat Bay, a book edited by Kennish and Lutz. We also consulted websites maintained by the Atlantic States Marine Fisheries Commission (ASMFC), National Marine Fisheries Service (NMFS), and the Mid-Atlantic Fishery Management Council (MAFMC). The text in Sections 4.1.1 and 4.1.2 has been revised to properly characterize Dr. Kennish's conclusions.

Comment: Based on the review of the Oyster Creek Nuclear Generating Station draft SEIS, the EPA has rated the project and document "Environmental Concerns-insufficient information" (EC-2). Our most serious concern is how the OCNGS will comply with Section 316 of the Clean Water Act and the how OCNGS will minimize the impacts due to entrainment and impingement of fish and shellfish. (HH-1)

Response: *The commenter is referring to the EPA's Phase II regulations for Section 316(b) of the CWA. The EPA has delegated the responsibility for compliance with the Phase II regulations to the NJDEP. The applicant has had discussions with the NJDEP and begun data collection in support of its Comprehensive Demonstration Study. Compliance with the Phase II regulations is the responsibility of the state of New Jersey. The NRC's regulatory jurisdiction is limited to the characterization of impacts in accordance with NEPA. In recognizing the Phase II regulations may result in modification to the OCNGS cooling system, the NRC staff, in Section 8.1 of the SEIS, evaluated two alternatives to the current cooling system proposed by the State of New Jersey. The NRC does not have the regulatory authority to require OCNGS compliance with the requirements of the CWA. OCNGS impacts due to entrainment and impingement would be minimized further according to requirements in the NJPDES permit. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Nonetheless, this facility's impacts to aquatic ecosystems over the course of its operation have been significant, contrary to the statements in the draft EIS. Start-up and operation of OCNGS reversed the flow of the South Branch of the Forked River away from Barnegat Bay, changed the salinity of the water and destroyed all of the brackish and fresh water habitat in the lower reach of the Forked River and Oyster Creek. Given these and other significant changes to the aquatic environment and the representative species, the facility's impacts cannot be appropriately described as small. (HH-6)

Response: *The decision to profoundly alter the lower reaches of Oyster Creek and Forked River was made at the time of station construction and predated NEPA. Evaluating impacts comparing conditions during the license renewal period to those that existed prior to construction is outside the scope of the license renewal review. The current impacts on these water bodies are discussed in Sections 4.1.1, 4.1.2, and 4.1.3 of the SEIS. The text of the SEIS was modified in response to this comment.*

Comment: There are no recent population trends for bay anchovy. (2-36). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-27)

Comment: There are no recent population trends for four-spined stickleback (2-37). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-29)

Comment: There are no recent population trends for menhaden -only catch information. Indeed, the catch is down. (2-38). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-30)

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Comment: There are no recent population trends for weakfish, and the population appears to be overfished. (2-39). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-31)

Comment: There are no recent population trends for spot; the condition of the stock is unknown. (2-39) How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-32)

Comment: There are no recent population trends for Atlantic silverside. (2-40). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-33)

Comment: The size of the striped bass population in the Bay is unknown. (2-41). Because of the stock's decline, resource management actions were necessary. How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-34)

Comment: There are no recent population trends for bluefish -only landing data. The stock had to be rebuilt. (2-42). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-35)

Comment: There are no recent population trends for winter flounder, but there is a FMP for the species. It is considered overfished and EFH has been determined. (2-43). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-36)

Comment: There are no recent population trends for northern pipefish. (2-44). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-37)

Comment: Commercial landing data is available for blue crab (2-44), but this [is] not the same as overall population levels or abundance. Just because there are recreational crabbers, that does not mean that the population can sustain both fisheries. NRC's conclusion with regard to what the population can withstand is unfounded. How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-38)

Comment: There are no population estimates available for shrimp. (2-45). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-39)

Comment: It is unclear if there are recent population trends for hard clams. The harvest has dramatically declined. (2-45). How can NRC make conclusions about the impact of the Facility in the absence of this information? (MM-40)

Comment: No recent investigations of zooplankton abundance have been conducted. They were only done in 1975-77. (2-49) How can NRC make any conclusions about impact to the environment without this data? (MM-42)

Comment: With respect to entrainment information, the DEIS fails to note or acknowledge that the status of populations in Barnegat Bay is unknown, and thus, it is impossible to make conclusions about the impact the once through cooling system is having on the Bay. Professor Michael Kennish's testimony at the July 12, 2006 public hearing highlights this problem, and it is discussed thoroughly elsewhere in this comment letter. (MM-55)

Comment: Bay anchovies are one of the most abundant species in Barnegat Bay and are ecologically important in that they serve as a food source for fish. There are no recent population trends for bay anchovies so the impact of Oyster Creek on this ecologically important species cannot be addressed. (QQ-5)

Response: *The NRC staff recognizes the lack of recent ecological information for many species in Barnegat Bay, and that this lack of information makes assessment of the environmental impacts of OCNGS operations particularly difficult. The NRC has revised its conclusions in section 4.1 of the SEIS to reflect the lack of recent data from Barnegat Bay. The findings in the SEIS are based on the best available information and have been revised to reflect this uncertainty.*

Comment: While voluminous, the Draft GEIS fails to take a "hard look" at the environmental consequences of the proposed re-licensing and alternative courses of action. The NRC has a legal duty to gather and evaluate new information relevant to the impact of its actions. Where essential information regarding adverse impacts to the human environment is incomplete or missing, the NRC must obtain the information or evaluate the existing data upon theoretical approaches or research methods. However, these objectives are not met by the Draft GEIS. The Applicant has failed to supply the NRC with such basic information as current annual impingement and entrainment mortalities. Moreover, the Applicant has failed to provide any recent data as to the populations of fish and other aquatic life in the Barnegat Bay system. Without this information, the NRC cannot reasonably determine the extent of the impact the OCGNS has had on this valuable estuary, let alone its anticipated impact over the next 20 years.

As detailed within, the Draft GEIS cites out-dated studies with glaring deficiencies for the purposes used therein. The Draft GEIS contains conclusions that are inaccurate, inappropriate, and unscientific. Some environmental impacts are either mentioned in passing without any meaningful discussion or analysis, while others are not mentioned at all. In addition, the Draft GEIS does not adequately review the implementation of a closed-cycle cooling system as an alternative to the present once-through system at OCNGS, which is mandated by federal law, strongly recommended by the State, and which can be designed to eliminate the concern of excessive salt deposition. Accordingly, COA and ALS believe the determination and conclusions contained in the Draft GEIS that the subject re-licensing will result in only a small impact, and that no viable alternative exists are not valid, insufficiently demonstrated and unsupported by necessary factual information, inappropriately narrowly drawn and based on

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methodologies discredited by the EPA. For the reasons stated herein, COA and ALS further believe these determinations to be arbitrary, capricious and unreasonable, and justify an action that will undoubtedly lead to increased environmental degradation of the Barnegat Bay system. (GG-2)

Response: *The NRC is required to make a decision regarding the proposed action using the best available information, and the SEIS provides a thorough evaluation of the environmental consequences of OCNGS operations during the 20-year license renewal term including (in Section 8.1) a detailed evaluation of the impacts associated with alternative cooling systems, including closed-cycle cooling. In conducting the environmental evaluation presented in the SEIS, the NRC used information from a variety of sources, including the applicant's ER, data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. The revised SEIS acknowledges that some of the data available for review are 30 years old and that conclusions regarding current impact levels are uncertain. The text of the SEIS has been modified in response to this comment.*

Comment: Moreover, in a nationwide study, the EPA made it clear that these older data sets are inadequate and new studies are needed to assess impacts. In the Federal Register dated July 9, 2004, the EPA stated:

"the methods for monitoring impingement and entrainment used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete, making quantification of impacts difficult in some cases. Recent advances in environmental assessment techniques provide new and in some cases better tools for monitoring impingement and entrainment and quantifying the current magnitude of the impacts [Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624.]

Similarly, the United States Fish and Wildlife Service ("FWS") provided specific comments to the NRC regarding OCNGS which also noted that the data were inadequate to assess impact. Specifically, the USFWS stated that "[t]he applicant's assertion that the impacts of entrainment of fish and shellfish are "small" cannot be supported adequately with data that are most likely outdated."

The comments provided below further support the assertions of both the EPA and FWS that the data being used to assess impacts of operations at OCNGS are clearly outdated and inappropriate. Accordingly, COA and ALS find that the conclusions set forth in the Draft GEIS are unsupported by sound science as they are based on studies that are flawed, deficient, old, and inadequate. (GG-6)

Response: *The presentation of aquatic ecology impacts has been revised in the SEIS to reflect the lack of recent data. The SEIS recognizes that because there are no recent published monitoring data, the conditions that existed during the original 316(a) and 316(b) studies may or may not exist today. It should be noted, however, that no entity (governmental or private) is collecting the basic biological monitoring data that would be applicable to assessing impacts on Barnegat Bay. Data on current impingement and entrainment rates are being collected now at OCNGS, but were not available at the time of this assessment. The text of the SEIS has been modified in response to this comment.*

Comment: As stated numerous times above, there are no data available on aquatic populations in the Bay for the past thirty (30) years and the limited, outdated data that are available is scientifically flawed.

In addition, original hydrodynamic models of the thermal plume produced in the mid-1980s were extensively flawed and the consequent models produced by the Versar Report were based on these original flawed data. Therefore, these models should not have been used in the Draft GEIS. In order to rationally and reasonably assess the extent and magnitude of the thermal discharge to Barnegat Bay, reliable and current data, together with newly available modeling technology, should have been employed.

We are aware of the current intake-sampling program being conducted at OCNGS. However, it is irrelevant to this GEIS assessment because it will only provide data on impingement and entrainment at the plant. Without a concurrent biological assessment of bay-wide populations and communities (including benthos, plankton and nekton), it is impossible to assess the impacts of plant-generated losses to the populations and communities within the Bay. Moreover, COA and ALS are concerned that the current sampling program will have many of the same flaws and limitations as previous studies (see above) because the work-plan was not peer-reviewed, and like the previous studies, the program is not being performed by independent consultants. We note that the California Energy Commission recently concluded that "determining impacts is fundamentally a science issue, and should be independent of the regulations it serves, and their interpretations, except as the regulation specifies the impacts to be determined." Based on this concept, "[r]ecent assessments (in California) have commonly relied on a technical working group composed of independent scientists plus representatives from relevant agencies, the consulting firms doing the study, the power plant owner/operator and, in some cases, environmental groups, to oversee study design, implementation, and data and impact analyses [Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.] We strongly recommend that this same judgment be applied to all OCNGS impact studies. (GG-7)

Response: *In conducting the environmental evaluation presented in the SEIS, the NRC used information from a variety of sources, including the applicant's ER, data and information*

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collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. The revised SEIS acknowledges that some of the data available for review are 30 years old and that conclusions regarding current impact levels are uncertain. As stated in the comment, data on current impingement and entrainment rates are being collected now at OCNGS. This data collection program was developed by the applicant and approved by the NJDEP to address AmerGen's requirements under the CWA. The text of the SEIS has been modified in response to this comment.

Comment: I have a long history of research experience in coastal waters of New Jersey, including Barnegat Bay, Little Egg Harbor Estuary.

I just want to mention one thing. I've been quoted a couple of times in the report. My main reason for being here was the quotes that were in that report, which indicate -- well, I can read one in particular. It states that "Despite large numbers of eggs, larvae, and small life forms at Barnegat Bay, organisms lost via impact passage at the OCNGS, these losses have not resulted in technical impacts on biotic communities in Barnegat Bay."

I want to emphasize that this publication that is in reference to, which I have edited and published after extensive peer review, among other things I have done in the bay, is in reference to a review of other documents, and of old material that goes back to 1975-77, 316(a) and (b) demonstration reports as well as the VERSAR report. I think it was '88 and '89. And so that is not an assessment of what I see today in terms of looking at the entire picture, the entire window from 1969 until today. And largely the report, the NRC's report, related to aquatic impacts, they have done the best job they could do with it considering the material they had to deal with, but it's relatively irrelevant because if you don't take into account impingement and entrainment and sampling at the same time in an assessed water body, in this case a central part of Barnegat Bay, the information is it's impossible to draw a proper assessment.

If you take the variation of a population in Barnegat Bay of any organism, at any one time, it could be two to three hundred percent. And to take a comparison of a population of how many organisms are being impinged or entrained at one time and then say, "Thirty years or 25 years later, you're comparing these numbers," that's also irrelevant because it doesn't take into account these fluctuations in the natural populations in the water body in the adult form. When they did these studies back in 1975, they did it. The only time it was ever relevant was when they did the work in 1975 and '77, when they actually had impingement and entrainment numbers and they did population surveys at the same time.

So you're dealing with old data, 30 years old. Today's information in that report is irrelevant. And, as it's not NRC's fault, the real problem lies with the Clean Water Act people, the EPA, and the DEP, who did not provide sufficient oversight on the parent company in terms of making sure that they did population surveys routinely and cyclical or periodic in the bay. With a variation of two to three hundred percent in populations at any one time, you really should be

doing population surveys almost every year. And considering the cost of that, I understand, but you should at least do it every five years.

It was not done for 30 years. And someone dropped the ball completely. And, in fact, if you have a parent company that espouses that they are environmentally friendly and concerned about the environment of the estuary, then it would be incumbent upon the company's own scientists. Some of whom have been there for 30 years themselves know better that they could have been doing population surveys periodically. That would have made the NRC's job much more easy to comprehend, to deal with and provide you with the necessary and accurate information that you need.

There are problematic areas. For example, the shellfish beds of Barnegat Bay have been on decline. That was a species which was a representative important species back in 1975 and '77. And it was not followed through. If you want to get into the statement to me that there are no observable impacts, well, one could contend that there is a correlation or association with that because hard clams have been on decline in the bay, in the central bay, for some time. There is also some indication that winter flounder populations are negatively impacted in the central bay as well.

I am not saying all of these things are due to the plant because I can't as a scientist and I won't do that. I want to be able to take data and to do data as a scientist and assess things as a scientist and come up with an effective proper conclusion. This can't be done the way it has been done in this process over the 30-year period. The information in the report is not accurate. It can't be accurate when you don't have population surveys that are conducted concurrently with impingement and entrainment studies.

And, by the way, they are conducting impingement and entrainment studies today right now at the power plant, which, again, are irrelevant. I'll repeat that: irrelevant unless they do surveys in the bay, which they're not doing. And to be able to go back and say, "Well, we have 10^{13} power of polychaete worm being cropped by the power plant today, and we had 10^{12} back in 1977. Therefore, everything seems to be okay" can't be done that way, not scientifically. You send that report out to my colleagues at Penn State and other universities. It would be rejected so quickly. It would be rejected very quickly. And that's part of the problem. You really need to take this information. (I-1)

Comment: The Draft GEIS also cites statements by Dr. Kennish [M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.] (2001) to support the conclusion that the impacts of impingement and entrainment are both SMALL. Dr. Michael Kennish is a marine research scientist at Rutgers University and holds a Ph.D. from William and Mary University. He is considered an expert in life history, ecology and behavior of fishes in the Barnegat Bay estuary. Dr. Kennish strongly rejects the use of his scientific review article to support the NRC's conclusion. During his testimony at the GEIS public hearing and

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again in his comments submitted on the GEIS (August 30, 2006), he clearly stated his conclusions and statements were taken out of context and are incorrect, including the following quotes made by Dr. Kennish in his August 30 comment letter:

- "I want to stress that this cited work is a review article, and the words quoted in the GEIS are taken out of context, thereby misconstruing the information."
- "Therefore, I object to . . . the use of the three quotes from my published article in the context shown on pages 4-15, 4-21, and 4-51 of the GEIS."

Accordingly, the reliance on the work of Dr. Kennish to support findings contained in the Draft GEIS of SMALL impacts is clearly misplaced. (GG-10)

Comment: There is a specific reference to one of my published articles on the Barnegat Bay-Little Egg Harbor Estuary that has been cited three times in the GEIS in support of the NRC conclusions of no significant impact of the OCNGS on Barnegat Bay aquatic populations. The cited work is found on pages 4-15, 4-21, and 4-51 and includes statements taken directly from the following publication (Kennish, M. J. 2001. "State of the Estuary and Watershed: An Overview," *Journal of Coastal Research*, Special Issue 32, pp. 243-273.). I want to stress that this cited work is a review article, and the words quoted in the GEIS are taken out of context, thereby misconstruing the information. More specifically, my article only supports the results of impingement, entrainment, and thermal discharge effects determined for the 1975-1977 period, the only period when impingement and entrainment data were collected concurrently with data population surveys in the bay. Thus, it is only relevant to a very small window of time – the two year period from 1975-1977 rather than to the entire operating period of the OCNGS (1969-Present). Therefore, I object to, and contend, the use of the three quotes from my published article in the context shown on pages 4-15, 4-21, and 4-51 of the GEIS. (OO-5)

Comment: The GEIS contained misconstrued information based on an extensive review of published information (academic journals or other sources) that led to a finding by NRC staff of no significant impacts on aquatic populations in the bay by the OCNGS. In fact, this is not the case.

This information (found on pages 4-15, 4-21, and 4-51 of the GEIS), contains citations from Kennish, M. J. 2001. State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*, Special Issue 32, pp. 243-273. The information from the aforementioned publication, does conclude that there is no significant impact of the OCNGS on Barnegat Bay aquatic populations, however it is specifically referring to the results of impingement, entrainment, and thermal discharge effects determined for the 1975-1977 period, the only period when impingement and entrainment data were collected concurrently with data population surveys in the bay.

Dr. Kennish contested the use of the these quotes from (pages 4-15, 4-21, and 4-51 of the GEIS) at the public hearing for the GEIS held on Wednesday, July 12, 2006, in Toms River, New Jersey. Therefore, the GEIS has based its conclusions on significantly out-of-date and out-of-context information, rendering their conclusions on OCNGS's impacts on the aquatic populations of Barnegat Bay irrelevant. (AAA-1)

Response: *The aquatic ecology impacts have been revised to reflect the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. The assessment acknowledges that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. It was not the intention of the NRC staff to quote the author out of context or to misconstrue his meaning. The text of the SEIS has also been revised to indicate that the comments of Dr. Kennish on the impacts of OCNGS were based on his review of the original 316(a) and 316(b) studies.*

Comment: Many different factors must be considered when attempting to analyze cumulative impacts, including natural fluctuations in populations, the different stressors that interact to impact the system, and community-level effects. None of these analyzes were conducted by NRC in order to reach a conclusion of SMALL cumulative impact of plant operations. Moreover, the data does not exist at this time to conduct such an analysis.

Analyzing cumulative impacts at the population level requires an understanding of the natural fluctuation of a population in relation to the combined effects of all the different losses associated with operations at OCNGS (from impingement, entrainment, thermal pollution, degraded water quality, etc.) over the lifetime of the plant. These total losses are incurred on the population every year with some consistency, yet natural aquatic populations are rarely stable, and according to Dr. Kennish, can fluctuate up to 300% annually. In years when a population is substantially reduced due to factors unrelated to plant operations, the additional impact of mortality from OCNGS may be much more substantial. Multiple years of poor recruitment of a population, combined with the consistent take from OCNGS operations, can ultimately lead to population crashes. For example, his scenario needs to be further explored in light of the hard clam fisheries collapse that has been documented in Barnegat Bay, especially considering that this species is consistently entrained by the once-through cooling system of OCNGS.

Many of the stressors (see Section A.3 above) that currently impact the Barnegat Bay are listed in this section, but the NRC fails to analyze the role of OCNGS-induced impacts in light of these issues. Although operations at OCNGS may not necessarily be responsible for all the stressors listed, the ongoing mortality caused by the plant could have a much more substantial impact on populations and communities, considering the additional impacts from all of these stressors. Therefore, an important part of assessing cumulative impacts is the relative contribution of once-through cooling systems to overall population decline. Cumulative anthropogenic sources of mortality can exceed the sustainability of the population, so that even a SMALL reduction in

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abundance of a species from OCNGS operations, can be enough to reduce that species below a threshold, thus resulting in a disproportionately large reduction in the population [Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005].

Finally, cumulative impacts must also take into account the impact to the community structure of Barnegat Bay. OCNGS operations target specific species based on size and habitat utilization. As these species continue to endure consistent losses, their decline in abundance may alter predator/prey interactions. Predators may move into other areas where their preferred prey is more prevalent leading to a shift in community structure. Dr. Kennish has reported such a change in benthic community structure, with a shift from a filter-feeder dominated community to a deposit-feeder dominated community [Michael Kennish, personal communication, July 27, 2006]. The statement that "there is no evidence to suggest that the operation of the OCNGS cooling-water system has significantly altered the marine and estuarine food web in Barnegat Bay or resulted in significant changes in phytoplankton or zooplankton species composition" is completely unsubstantiated considering no bay-wide fisheries or invertebrate surveys have been conducted in Barnegat Bay for over thirty (30) years.

The Draft GEIS states, "[i]t is likely that plant operations contribute to some of the environmental concerns found in Barnegat Bay; the precise contribution, however, cannot be quantified without long-term studies of the estuary." Despite this clear and acknowledged lack of understanding, the Draft GEIS still concludes that "the cumulative impact of continued operation of the OCNGS once-through cooling system on aquatic resources in Barnegat Bay estuary would be SMALL." This conclusion is (1) unsubstantiated, and (2) apparently based on the Versar Report and statements made by Dr. Michael Kennish, neither of which provide a proper basis for the reasons set forth in Sections A.2, A.4 and A.6 above. (GG-19)

Response: *On the basis of comments received on the draft SEIS and additional analysis, the NRC staff has revised the cumulative impact assessment presented in Section 4.8.1 of the SEIS.*

Comment: There is clear evidence of a dramatic decline of both the hard clam (*Mercenaria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*) populations in the bay. Both of these species, with early life stages cropped by the OCNGS, were listed as Representative Important Species in the 316(a) and (b) Demonstration Report submitted to Federal and state government agencies in 1978. These populations in the bay have not been effectively tracked over the past 30 years. The same comments above (albeit for different species) also apply to the following statement on page 4-21 of the GEIS: "There is no evidence to suggest that past, current, or future impingement of these species would destabilize or noticeably alter any important attribute of the resource." The lack of bay surveys during the past three decades, therefore, undermines the fundamental conclusions of the GEIS with regard to minimal impacts of impingement and entrainment of the OCNGS on aquatic populations in the bay. (OO-4)

Response: *The comment is confusing in that the first sentence suggests there is clear evidence of a dramatic decline of hard clams in the bay, yet a subsequent sentence indicates the populations have not been effectively tracked for 30 years. There is anecdotal information and some studies that have shown a large decline of hard clams throughout their' range in New Jersey. This illustrates the confusion concerning the abundance of these species in Barnegat Bay. To account for the lack of recent monitoring data, the aquatic ecology impact analysis has been revised. The assessment acknowledges that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. The NRC staff also suggests that future monitoring studies should be designed to evaluate multiple environmental stressors (both anthropogenic and natural) at spatial and temporal scales sufficient to address the inherent variability within the system. The text of the SEIS has been modified in response to this comment.*

Comment: The supplemental EIS for OCNGS discusses only 17 of the 108 fish and shellfish species associated with Barnegat Bay and among those that are addressed, current population estimates are given for only two, the hard clam and shipworms. This does not connote a thorough, "hard look" at the environmental impacts associated with the operation of OCNGS. Water temperature is the primary factor in hard clam spawning and it is reasonable to conclude that significant population decreases over the past few decades are due to temperature increases and a range of stressors, including deteriorated water quality, algal blooms and chemical contaminants, among which OCNGS plays a significant role as the nearest point source. Conversely, shipworms show increased rates of reproduction in higher water temperatures and greater salinity. Since the opening of OCNGS in 1969, a shipworm habitat has established itself in the creek, especially in areas influenced by the reactor's thermal plume. Oyster Creek is now infested with native and non-native shipworm species that are highly destructive to untreated wooden piling and boat hulls. Submerged aquatic vegetation and phyto- and zooplankton populations that provide critical habitat for many estuary species are in marked decline, largely due to frequent algal blooms and decreased water quality. (EE-12)

Response: *The representative important species chosen for inclusion in the SEIS are consistent with Ecology of Barnegat Bay, New Jersey (Kennish and Lutz 1984) and the Barnegat Bay Estuary Characterization Report (BBNEP 2001). According to the characterization report, the two nonnative species of shipworm (Teredo bartschi and T. furcifer) are no longer present in Oyster Creek. Spawning of hard clams is mostly affected by water temperature and food availability. However, the thermal discharge from OCNGS would not cause significant population decreases because hard clams spawn when water temperatures increase above 68-73 °F (CBP 2003). Therefore, it is unlikely that OCNGS operations would adversely affect spawning of hard clams. Remaining shipworm populations are resource limited because of the replacement of wooden pilings and structures with concrete and other materials. There is anecdotal information and some studies that have shown a large decline of hard clams throughout the species' range in New Jersey. This decline is not likely the result of OCNGS operation. It is much more likely that a general degradation in regional water*

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quality due to coastal development has led to a state wide decline in hard clam abundance. Because of a lack of recent monitoring data, it is not possible to determine the current status of phytoplankton or zooplankton communities, but the commenter is correct in noting the presence of algal blooms, which have been confirmed in scientific literature and may be responsible for reduced submerged aquatic vegetation in the estuary. This is noted in Section 2.2.5 of the SEIS. The text of the SEIS has been modified in response to this comment.

Comment: Environmental Impacts of Operation, Heat Shock (Page 4-23, Lines 4-7)
"...shall not be raised by no more than 2.2 degrees C (4 degrees F) from June through August, nor more than 0.8 degrees C (1.5 degree F) from June through August..."
This statement conflicts. (PP-3)

Response: *The referenced text in the SEIS has been corrected.*

Comment: Environmental Impacts of Operation, Thermal Plume extent violations (Page 4-23) Supplement 28 to the Draft SEIS is not clear on what the outcomes of the violations were. (PP-4)

Response: *Summers et al. (1989) suggested that the NJDEP grant OCNGS a thermal variance subject to the conditions described in the 2005 NJDEP fact sheet. In response, the NJDEP granted OCNGS a variance to thermal discharge requirements. This variance is discussed in Section 4.1.3 of the SEIS and is also discussed in the 2005 NJDEP fact sheet. The text of the SEIS has been modified in response to this comment.*

Comment: The DFW has concerns about the cumulative impact of the use of chlorine and biocides on estuarine organisms. No mention was made if any studies or modeling has ever been performed to examine potential long-term impacts of this procedure. (PP-16)

Response: *OCNGS is required to monitor chlorine and biocide usage as a condition of its NJPDES permit. Monitoring reports are submitted to the NJDEP per the requirements of the permit, but studies and/or modeling of long-term impacts have not been required by the NJDEP. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The DFW has some concerns regarding the methodology used to measure fishkills. Entrained fish eggs and fish larvae are subjected to extremely high temperatures where mortalities are high. Cold shock due to unexpected shutdowns results in more fish mortality than observed or reported. When a plant shuts down and a fish kill occurs, dead fish are collected and enumerated. What is not observed are the schools of fish that follow the last "pocket" of warm water discharge out Oyster Creek and into Barnegat Bay. During the winter, as that "pocket" of warm water is cooled to the temperature of the water around it, those remaining fish (now off site of the OCNGS) and in Barnegat Bay, succumb to thermal shock.

During the winter, the cold water slows the decomposition process down dramatically, and the dead fish sink to the bottom. The extent of this mortality should be evaluated. (PP-17)

Response: *The available information on fish kills due to cold shock and heat shock is described in the SEIS in Section 4.3. Included is a short description of the procedures that AmerGen personnel follow to document station related fish kills. Fish kill documentation is provided to the NRC by OCNGS and is publicly available. The phenomenon described in the comment has not been documented in Barnegat Bay. It appears unlikely that a pocket of warm water could move into the Bay without being rapidly dispersed. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Pages 2-21 and 4-7 address fishkills related to plant shutdowns. It should be stressed that whether such fishkills occurred during planned or unplanned shutdowns, any resultant fishkills are subject to the assessment of fines. (PP-18)

Response: *Oversight and enforcement of compliance with NJPDES limits for OCNGS is the responsibility of the NJDEP. The NRC staff provides a description of past fish kills in Section 4.1.3 of the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Several present DFW staff members took part in the '84-'86 study before joining the DFW. The DFW believes that there are statements in the report that are misleading and require some clarification. Pages 4-18 to 4-19, suggest the EA study over underestimated catch due to mesh size not matching mesh size of Ristroph screens. The GEIS indicates that 10.7 mm was used on sampling gear for nine years, 6.4 mm used for one year, whereas mesh size on screens was 9.5 mm. The DFW staff believes all openings except for the last year were 3/8" (this is 9.5 mm). The difference is how mesh size is measured and whether or not the wire around each individual panel is included. The DFW believes that measurements reported by environmental assessment included the thickness of wire surrounding each opening (because that's how it was ordered from the supplier at the time), which would add another mm or so to the width. Pages 4-18 to 4-21 - the 6.4 mm wire mesh utilized in the pool, the DFW believes, it would not have mattered what size was used on the fabric mesh of the collection net, since anything in the sluiceway experienced the effects of the screening process and would have been retained in the pool. Water in the sluiceway could have been sampled with 1/2" mm mesh and the method still would have been valid because the sample would end up in the pool and be processed. (PP-19)

Response: *The NRC staff has revised Section 4.1.2 of the SEIS in response to the comment. Because it is not possible to conclusively validate the statements contained in the comment, we consider the Summers et al. (1989) conclusion valid because it represents an environmentally protective approach and was used as the basis for the NJPDES permit by the NJDEP.*

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Comment: Important Fish and Shellfish near the OCNGS are discussed in Section 2.2.5.3. Along with a "species profile" for important species in the area, the GEIS includes the general statement (or variation thereof) that "primary anthropogenic stressors include hydrologic changes resulting from water diversion or water withdrawal activities." This water diversion/withdrawal (up to 1.25 million g.p.m.) is the principal source of the DFW's concern, yet in many respects is dismissed, perhaps as an unavoidable adverse impact in the opinion of some. Other potential sources of impact typically mentioned include eutrophication and stormwater runoff, which are probably included for completeness but may be included to divert attention away from the potential factor that is the focus of the GEIS. This section of the report also notes whether or not essential fish habitat for a particular species has been designated for Barnegat Bay and seems to infer that if there is no such essential fish habitat (EFH) designation, that species is not an issue for the OCNGS. Given the huge volumes of water taken in by the once-through cooling system and the losses of various fish and invertebrate species through impingement and entrainment mortality, it seems plausible that the plant operation is impacting the estuarine food web of Barnegat Bay in some manner even though there as yet may not have been significant, documented impacts to specific species. Has any effort ever been made to look at long-term impacts to the food web of the bay? (PP-20)

Response: *The NRC staff recognizes that the water withdrawal activities at OCNGS represent a potential adverse impact at near-field (Oyster Creek and Forked River and adjacent areas of Barnegat Bay) and far-field (Central Barnegat Bay) areas. It was not the staff's intention to infer that the lack of an essential fish habitat (EFH) designation for a particular species suggested that there were no potential adverse impacts. Rather, the staff used the EFH designations and also the representative important species designations available in technical documents or reports on Barnegat Bay to frame the impact discussions. The SEIS has been revised to acknowledge the lack of recent monitoring data and its implications on assessing the magnitude of impacts. In addition, the commenter asks if there have been any studies that look at long-term impacts on the food web in Barnegat Bay. Although the NRC staff is unaware of any such studies, Kennish and Lutz (1994) provide the most comprehensive assessment of the Bay at all trophic levels. The text of the SEIS has been modified in response to this comment.*

Comment: On page 4-18 - the statement that the pool being an overestimate of abundance, DFG staff disagrees mainly because smaller, soft-bodied fishes (e.g. bay anchovies) could go through the 3/8" mesh of the screens (i.e. go head first instead of being sideways), be crushed or eaten, be trapped between then screens and feeding predators, get mangled in eel grass and therefore not end up in the sluiceway to be counted. If anything, it is the opinion of our professionals that pool collections grossly underestimated abundance of smaller, soft-bodies fishes and macroinverts such as bay anchovies, silversides, sand and grass shrimp. So basically, the last year of sampling, which utilized the pool technology, was most likely more reflective of abundance than in previous years (not an overestimate as stated in the NRC report), but it still underestimated numbers of small fish and small macroinvertebrates. (PP-21)

Response: *The accuracy of this comment cannot be determined because the requisite studies to make a determination were not conducted at the time of the sampling. Additional information has been added to Section 4.1.2 to indicate that it is not possible to accurately determine whether abundances were over- or underestimated. The NRC staff had included the assessment of Summers et al. (1989) in the SEIS because it generally reflects an environmentally protective approach and was the basis for the NJPDES permit. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Entrainment of Phytoplankton and Zooplankton (Page 4-7). The DFW does not agree with the following: references the General EIS for power plants and concludes that 'entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants'---a remarkable conclusion based on the losses to benthic infauna (including hard clams) as noted in the GEIS. (PP-22)

Response: *In preparing supplements to the GEIS, the NRC relies on conclusions reached in the GEIS unless "new and significant information" suggests that the conclusions reached in the GEIS were wrong. Because of the high fecundity and wide distribution of benthic infaunal species throughout the Bay, it is highly unlikely that continued OCNGS operations would have an adverse impact on those populations in Barnegat Bay. It is much more likely that a general decline in regional water quality due to intense development would result in a bay-wide decline in abundance. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Dissolved Oxygen Issues (Page 4-8). The DFW requests additional information on the position stated on this page, "that low D.O. has been a problem at one nuclear power plant with a once through cooling system, but that it has been effectively mitigated." This section further adds that low D.O. has not been a problem at plants with cooling towers or cooling ponds. Has low D.O. ever been an issue at the OCNGS and if so, how was this situation mitigated? Or does it require mitigation? (PP-23)

Response: *Plant-related impacts on dissolved oxygen are discussed in the GEIS (NUREG-1437, Volume 1) as noted in Table 4-1 of the SEIS. The plant referred to in the GEIS that had a dissolved oxygen issue was the Sequoyah Nuclear Plant in Tennessee. The concern at that plant was related to the effects of low dissolved oxygen on downstream mussel beds and sauger (*Sander canadensis*) reproduction. The problem was unique to the site and was related to heated discharge from the plant interacting with water released from an upstream dam that occasionally had low dissolved oxygen. That problem was subsequently mitigated and has no bearing on OCNGS. A study conducted in Barnegat Bay from 1976 to 1980 found no statistically significant differences in concentrations of dissolved oxygen which was sampled at several locations including the mouths of Forked River and Oyster Creek (Voughlitois 1983). The NRC staff did not identify any issues at OCNGS associated with low dissolved oxygen, and the*

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impacts are expected to be consistent with those identified in the GEIS, that is, of SMALL significance. The text of the SEIS has been modified in response to this comment.

Comment: The EPA's new rules under Section 316(b) of the Clean Water Act (in 40 C.F.R. § 125) require OCNGS to reduce its entrainment of fish and shellfish in early life stages. The draft SEIS discusses the new rules that are in effect, and states that there is an application for renewal of the NJPDES permit. To be in accord with the new 316(b) regulations, the facility has proposed mitigation measures to minimize these impacts and NJDEP has discussed these measures in the draft NJPDES permit and summarized those provisions and findings in the Fact Sheet for the permit. (HH-8)

Comment: Fish and Shellfish Entrainment Mitigation (Page 4-11). It is noted that "entrainment of fish and shellfish into the cooling water system is a potential adverse impact." This section notes that as part of the permit renewal process, the applicant may be required to alter the intake structure, redesign the cooling system, modify station operation, or take mitigative measures as a result of this regulation." The GEIS should be considering all these actions and in any case should require mitigation for the fish and shellfish resources impacted by the relicensing of the OCNGS. (PP-24)

Comment: We do know that millions of small fish, shrimp and other aquatic animals are currently being killed due to the fact that the plant has no water cooling towers. Cooling towers are a necessity to prevent these losses of marine life which are trapped against water intake screens, or drawn into the plant, or killed by the change in water temperature in the bay. Restoring wetlands is not a reasonable alternative. (XX-5)

Response: *In Section 8.1 of the SEIS, the impacts of replacing the once-through cooling system with a closed-cycle system are evaluated. The need for such a system to mitigate impacts on aquatic resources is subject to a determination by the State under Section 316(a) and 316(b) Phase II of the CWA, and could be a condition of the new NJPDES permit. The State of New Jersey also proposed restoration of wetlands as a partial alternative to the current cooling system. Restoration is a viable option under EPA's Phase II regulations. The text of the SEIS has been modified in response to these comments.*

Comment: The Versar report (1989) noted that blue crabs and hard clams were the two species of both recreational and commercial importance impacted by the OCNGS. Table 4-3 (page 4-13 of GEIS) indicates that the annual entrainment losses for the studied period of 1975-1981 for blue crab larvae was 182 million organisms. Annual losses for this same period for hard clam larvae was 112.3 billion organisms. However, the GEIS makes little mention of the OCNGS impact on the bay's population of these two species. With respect to blue crabs, the GEIS discusses NMFS commercial blue crab landings and indicates that there is a thriving recreational blue crab fishery in Barnegat Bay, "suggesting that the population of blue crabs are

currently sufficient to sustain both commercial and recreational uses." Using the current state of the recreational fishery to reach this conclusion seems somewhat of a "stretch".

Despite the huge losses of larval clams attributed to plant operation, in discussing the decline of hard clams in Barnegat Bay, the GEIS addresses a number of other factors, none of which include larval losses due to entrainment. It even include a reference to QPX disease, which typically occurs only in clams stressed by high density conditions---which is not the case in Barnegat Bay, where hard clam densities have fallen dramatically. For example, a survey of the southern portion of the Barnegat Bay System south of the Route 72 causeway (an area typically referred to as Little Egg Harbor Bay), hard clam stocks declined by two-thirds between the DFW surveys in 1987 and 2001. We may now be at a point of "recruitment limitation," where densities are so low that the successful union of gametes released into the water is greatly diminished. With respect to declines in hard clam stocks in Barnegat Bay, the GEIS provides some interesting related data in its discussion of benthic infauna (pages 2-47/48). The GEIS notes that the densities of three benthic invertebrate species studied decreased from 9,000 to 17,000 individuals per square meter in 1969 to less than 500 individuals per square meter in 1973 (a decline of 94.1 to 97.1%). Coincidentally, the OCNCS began operation in December of 1969. It's not inconceivable that the entrainment losses reported for hard clams occurred for numerous larval organisms (both invertebrates and vertebrates), thereby having significant, albeit undocumented impacts on the bay ecosystem. (PP-25)

Response: *The NRC staff used recreational and commercial landing data for representative important species because recent monitoring data were not available. The linkage between OCNCS operations and benthic invertebrate decline cannot be demonstrated, but the discussion of the benthic resources in Section 2.2.5 has been modified to describe historical trends. The U.S. Fish and Wildlife Service (FWS) has determined that the blue crab is "demonstrably secure throughout the Bight [New York Bight watershed, which includes Barnegat Bay] . . . The species is generally considered to be common to abundant." On the other hand, the hard clam appears to be declining throughout its range in New Jersey; however, it is unlikely that this decline is related to OCNCS operation because of the species' high fecundity and wide distribution. The aquatic ecology impact assessments for entrainment, impingement, and heat shock have been modified to reflect potential adverse impacts at both near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations.*

Comment: On page 4-15, the following is stated with respect to entrainment losses and the resulting conclusions of the Summers et al 1989 report: "This assessment (Summers et al 1989) was based on population and ecosystem modeling (equivalent adult model, production foregone model, and spawning/nursery area of consequence model) to determine the environmental consequences of impingement and entrainment. The results of these models evaluate the combined losses associated with both impingement and entrainment. Using conservative assumptions to estimate OCNCS impingement and entrainment losses, data

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available on population sizes, and survival rates and trophic relationships, Summers et al. (1989) concluded that population losses were rapidly compensated for by reproduction (e.g. sand shrimp), were a small fraction of the bay population (e.g., blue crab and winter flounder), or had little effect on higher trophic levels (e.g., bay anchovy and opossum shrimp).

Although NJDEP (2005) acknowledged the Summers et al. (1989) conclusion that OCNGS did not appear to produce "unacceptable, substantial long-term population and ecosystem level impacts," the agency stated that it is not necessary to prove that an impact on a population is occurring to require the applicant to meet Section 316(b) performance standards."

While this excerpt is not incorrect, it is important to reference relevant regulatory changes that have occurred since the release of the Summers et al report in 1989 and the resulting 1994 NJPDES permit that provide the background for this position as contained in the draft NJPDES permit. Due to the fact that the EPA Phase II section 316(b) regulations focus on plant data (i.e. impingement and entrainment data), biological monitoring that feeds into any assessment of effects to bay-wide populations is not directly relevant for the purposes of the Phase II section 316(b) regulations at this time. Prior to the release in 2004 of the EPA Phase II section 316(b) regulations, a study of any effects on biological populations was a focal point of the document entitled Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 (U.S. EPA, 1977). In contrast, the 2004 EPA Phase II section 316(b) regulations uses a reduction in impingement and entrainment as the metric for complying, where in some compliance alternatives the goal is the attainment of national performance standards, and impacts to populations are not considered.

As described in the Department's comments to EPA Headquarters on the draft Phase II section 316(b) regulations, the Department expressed concern about a population focus as opposed to a focus on impingement and entrainment effects. This was due to the fact that results of biological population studies and modeling can be very subjective because it is difficult to identify, measure, and attribute the impact of each of the many variables (e.g. fishery regulations, climate effects) affecting populations of each of the impacted species. Rather than engage in this kind of biological debate, time and resources would be better spent focusing on the magnitude of the impingement and entrainment losses in relation to the costs and benefits of implementing various technologies to avoid or minimize the impact.

The Department agrees that biological data is useful in monitoring the health of the estuary and acknowledges that both plant-related data and biological data of Barnegat Bay are dated. Nonetheless, the Department determined that this data was sufficient for the purposes of developing a section 316(b) determination in its 2005 draft NJPDES permit. The Department hereby questions USNRC if adequate data is typically found at other power plants that are the subject of a license renewal. (PP-36)

Response: *The comment correctly reflects the overriding goals of the Phase II requirements, and the NRC staff agrees that it is very difficult to interpret entrainment and impingement data because of the large variance in measured values. The assumption is made with respect to the EPA's Phase II regulations that a reduction in impingement and entrainment through the use of improved technology would result in improvements in the biota of the source and receiving water body. It is not based on a determination of measured improvement in the ecosystems. The NRC's NEPA responsibility is to assess the impacts on the environment, irrespective of the difficulty of the task. The revised SEIS reflects the difficulty and uncertainty in interpreting plant-related data, whether recent or dated. The amount of environmental monitoring data available at operating nuclear power plants varies. Very few facilities with once-through cooling that have applied for license renewal have current impingement and entrainment data with attendant population information from the source water body. The data considered are typically those developed as part of the original 316(b) demonstration. The text of the SEIS has been modified in response to this comment.*

Comment: On page 4-24, the following is stated: "Summers et al (1989) also were critical of the hydrodynamic modeling conducted to support the 316(a) demonstration and concluded that the two-dimensional steady-state mass and heat balanced model used "...was a poor reflection of the dynamic conditions characterizing Barnegat Bay" and that "... the modeling regime chosen does not represent the best available methods for evaluating plume characteristics."

The NRC staff's conclusion is that the analysis conducted by Summers et al. (1989) provided the most realistic and complete description of thermal impacts associated with OCNCS and was taken into account during the NJDEP's development of the draft NJPDES permit."

The Department agrees that the Summers et al (1989) report did indeed recognize these shortcomings of the Section 316 demonstration. However, it seems as if the conclusions from the Summers et al (1989) report regarding the thermal discharge are missing and should be included prior to including the NRC staff's conclusion. Specifically, on page VIII-1 of the Summers et al (1989) report the following is concluded: "The Oyster Creek NGS does not comply with NJDEP's Surface Water Quality Standards for thermal discharges. However, present discharge effects are small and localized and have no adverse consequences to Barnegat Bay." And, on page VIII-3 of the Summers et al (1989) report: "Based on the findings summarized in this report, balanced indigenous populations of Barnegat Bay are protected under Oyster Creek NGS's current operations (maximum BTU/hr of 5.42×10^9). Therefore, if the designated heat dissipation area was increased to the area currently occupied by Oyster Creek NGS's thermal plume, Barnegat Bay populations would continue to be protected." It seems appropriate to include some of these conclusions of Summers et al (1989) in this section. (PP-48)

Response: *The Summers et al. (1989) conclusions have been added to the discussion of impacts in Section 4.1.3 of the SEIS.*

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Comment: During the past 35 years of OCNGS operation, significant concerns have existed regarding impingement, entrainment, and thermal impacts on estuarine and marine life. As a result, the Science and Technical Advisory Committee (STAC) of the BBNEP convened a meeting on November 1, 2005, and developed the following recommendations for the NRC regarding the OCNGS.

- An independent, scientific body (similar to the National Academy of Science) must be assembled to coordinate and oversee surveys and studies on the impacts of the OCNGS on the Barnegat Bay/Little Egg Harbor estuary.
- There have been very few peer-reviewed studies during the past 30 years of the impact of OCNGS on the population of aquatic communities in central Barnegat Bay. Additional studies *must* be conducted in the Barnegat Bay/Little Egg Harbor to accurately assess these impacts and they *must* be done concurrently with entrainment and impingement studies.
- The NRC *must* require the OCNGS to focus on remediation of its *direct* impacts on estuarine and marine organisms in the Barnegat Bay/Little Egg Harbor estuary.
- The use of wetlands restoration as a mitigation measure *must not* be implemented in place of remediation efforts targeting bay populations and communities of organisms.

The BBNEP recommends strongly that the renewal permit include a condition that charges the BBNEP with the role of the independent scientific body whose purpose is to coordinate research efforts in the Barnegat Bay relating to the effects of the OCNGS. The BBNEP's Comprehensive Conservation and Management Plan (CCMP) recognizes the need for such an entity. Action Item 5.15 of the CCMP charges the BBNEP with establishing this technical group for the examination and coordination of data in order to understand OCNGS's role in the overall ecological health of the bay.

Program partners agree that the BBNEP can and should have the lead role in coordinating and overseeing much-needed surveys and studies regarding OCNGS's effects on the Barnegat Bay ecosystem.

In conclusion, the position of the BBNEP is that regardless of the option pursued by the NRC regarding Oyster Creek's license renewal, without question, the OCNGS absolutely must be required to conduct detailed, comprehensive studies of the communities of bay organisms to determine what the overall impact of the power plant is on Barnegat Bay. (AAA-2)

Response: *NEPA does not require an independent review of agency findings with respect to environmental analysis. In addition, the NRC does not have the authority to require OCNGS to remediate impacts on aquatic organisms in Barnegat Bay as that authority was granted to the EPA under the CWA. The EPA delegated that authority to the state of New Jersey. The State*

will determine through the NJPDES process appropriate mitigation, which could include restoration. The ongoing NJPDES permitting process will result in a determination of the compliance action taken by AmerGen to meet requirements of the CWA. The requirement for additional monitoring will be determined by the NJDEP. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: The other study cited in Section 2.2.5.1., by the Global Land Cover Facility, does not demonstrate that the wetlands in Barnegat Bay are being impacted in the manner suggested by the DEIS. Instead, a better source of information is Lathrop, R. G. and J. A. Bognar. 2001, Habitat loss and alteration in the Barnegat Bay region, in M. J. Kennish (editor), Barnegat Bay-Little Egg Harbor, New Jersey: Estuary and watershed assessment. Special Issue 32, Journal of Coastal Research, pp. 212-228. The Barnegat Bay system lost about 4,190 hectares (-27%) of its salt marsh habitat over the century period from 1870 to 1970 primarily due to development, but also due in part to mosquito ditching. Since 1970, however, the loss has been minimal with estimates of about a 1-1.5% additional loss over the past three decades. The Wetlands Act has been critical to this stabilization. The current loss of salt marsh is very small in the system, and in fact there are some areas, most notably in the vicinity of Barnegat Inlet, where the salt marsh area has actually increased according to the authors. In conclusion, they state the following (p. 224): "The Wetlands Act of 1970 appears to have been largely successful in halting the high rate of loss of tidal salt marsh habitats due to human development." [Lathrop, R. G. and J. A. Bognar. 2001, Habitat loss and alteration in the Barnegat Bay region, in M. J. Kennish (editor), Barnegat Bay-Little Egg Harbor, New Jersey: Estuary and watershed assessment. Special Issue 32, Journal of Coastal Research, pp. 212-228 at 224.] By way of comparison, other nearby states in the Mid- Atlantic region (e.g., Delaware) show the same steep decline in salt marsh habitat prior to the Wetlands Act and then more recent stabilization since 1970. The fact that the tidal marshes along the Barnegat Bay-Little Egg Harbor Estuary appear to be stable, however, in no way suggests that there hasn't been any loss, or that restoring these areas would not benefit the Bay. [Kennish, M. J. 2001. Coastal salt marsh systems: a review of anthropogenic impacts. Journal of Coastal Research 17: 73 1-748.] While the members of the Coalition firmly believe that we must vigilantly protect our salt marshes, allowing the Facility to "mitigate" its harmful affects on the environment by essentially writing a check and restoring other land does not address all of the problems caused by the Facility and does not satisfy the requirements of the CWA. (MM-11)

Response: *The reference mentioned in the comment (Lathrop and Bognar 2001) was included in the NRC staff review. Sections 2.2.5.1 and 2.2.5.4 of the draft SEIS have been revised to include their summary conclusions concerning habitat loss.*

Comment: The studies referenced in this section are limited to 3 year period, and were conducted post-operation of the Facility and nearly 10 years after construction began. In

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addition, there were collected from Western Barnegat Bay and do not represent a full Barnegat Bay study. (MM-26)

Response: *The referenced report (Tatham et al. 1984) represents the best information available on fish species of Barnegat Bay. The NRC staff recognizes the lack of a recent comprehensive assessment of fish communities in Barnegat Bay, which makes assessment of the environmental impacts of OCNCS operations particularly difficult. The findings in the SEIS have been revised to reflect this uncertainty.*

Comment: With respect to the American eel (2-36), it is a catadromous species. The current abundance of American eel is unknown. The dam may be restricting upstream migration. This species was not evaluated in the 316(b) study. The fishery appears to be in decline, and FWS is engaged in a status review. FWS has already determined that a listing may be warranted, and the 12 month finding required under the ESA is due. What consideration does NRC give to the impacts another 20 years of operation will have on this species? (MM-28)

Response: *Potential impacts of the fire pond dam on the American eel are discussed in Section 4.7 of the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The DEIS reports that benthic infauna declined from 1969-1973 (2-48). The DEIS says that it is not possible to determine whether the Facility is a contributor to the decline, but does not cite any authority for this conclusion. What is NRC's authority for this conclusion? Localized impacts have been documented. Mobile epifauna inhabit the Bay, but the current abundance has not been estimated with any precision. (2-49) (MM-41)

Response: *The statement in the draft SEIS concerning the uncertainty of relating OCNCS activities to changes in benthic infaunal communities was a conclusion based on the NRC staff's review of the available data. To determine whether OCNCS is impacting benthic infauna, additional studies would be required. It should be noted, however, that Kennish (2001) in reviewing the results of the OCNCS 316(a) and 316(b) study conducted from 1975 to 1977 concluded that impacts appeared to be restricted to the discharge canal and Oyster Creek. This conclusion may or may not be valid now, but this cannot be determined without additional monitoring data. The text in the SEIS has been modified to reflect the uncertainty associated with a lack of recent data.*

Comment: On page 4-10 (lines 35-39) what articles support this conclusion? The DEIS fails to cite any support for this conclusion. (MM-56)

Response: *There are no conclusions stated on page 4-10, lines 35-39 of the draft SEIS. The paragraph only summarizes the approach of the NRC staff. A complete reference list is*

provided at the end of each chapter in the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: On line 31 at page 4-11, there is a discussion about mitigation, but the assumptions about the Phase II rules is incorrect. NRC should review the attached comments^(a) on the draft NDPEs permit and the attached letter to Commissioner Jackson on this point, both of which are incorporated herein and are to be considered part of the record. (MM-57)

Response: *The SEIS has been modified to clarify AmerGen's options under the EPA's Phase II regulations.*

Comment: On page 4-48, there is a discussion about the fire dam and its impact on shad. NRC does not discuss the possibility that shad are not using the creek because the creek was essentially destroyed in 1965 when the Facility began construction. There were no studies done prior to this to establish the baseline, so NRC and the applicant cannot conclude that there is no impact. The pond for firefighting will continue to exist because of the dam. If the license is not renewed, the dam could be removed and the pond water returned to the creek; therefore, the pond is affected by the decision to renew the license and should be considered. Indeed, the no-action alternative should review the positive environmental impacts of dam removal. (MM-64)

Response: *As stated in Section 4.7, the fire pond and dam are not owned by AmerGen. As a consequence, their disposition, should the OCNGS operating license (OL) not be renewed, cannot be determined at this time. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Also, since there has not been any recent data collected to support the claims of small or minimal impact, we find these conclusions to be unsupported and incorrect. However, we understand that NRC and AmerGen are currently conducting studies, at the request of the New Jersey Department of Environmental Protection (NJDEP) that are intended to support the New Jersey Pollution Discharge Elimination System (NJPDES) permit application. We wholly support that effort as well as the U.S. Fish and Wildlife Service's recommendation that at least 3 years of biological sampling studies should be performed. We expect that since this information will be new and potentially significant and will be used to inform the decisions on operations and mitigation measures, it will be included in the final SEIS. (HH-7)

Comment: It is the DLUR's [NJDEP's Division of Land Use Regulation] understanding the applicant has been conducting entrainment and impingement studies from approximately

(a) Attachments referred to in the comment are not included in the SEIS. They are available for download from NRC's ADAMS website at <http://www.nrc.gov/reading-rm/adams/web-based.html> under accession number ML062610416.

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October 2005 to the present. The DLUR does not understand why this ongoing study does not represent a "new study" and how the NRC can conclude without reviewing the results of the on-going study, "that there would be no problems associated with the entrainment of phytoplankton and zooplankton during the renewal term beyond those discussed in the GEIS." (QQ-1)

Comment: The Draft SEIS fails to mention that the OCNGS has been conducting an entrainment study which began in September 2005. However, this study has not been concluded and the assessment of data has not been completed, therefore how can the statement of "no problem" be made? This issue will be further evaluated through the Department's NJPDES process. (QQ-9)

Response: *The comments refer to an impingement and entrainment characterization study initiated at OCNGS in response to EPA Phase II rules as administered by the NJDEP. The study results are not yet available and will not be available prior to the publication of the final SEIS. Preliminary impingement and entrainment data (September 2005 to July 2006) suggest that the species composition and relative numbers of organisms impinged and entrained at OCNGS are similar to those observed during the 316(b) demonstration study. Because of the high variability associated with the original 316(b) data and the current information, and the fact that the study by AmerGen is ongoing, it is not possible to determine at this time if impingement or entrainment has changed significantly since the original study. Because a baywide fishery assessment was not included or required in the current study design, there are no current population data available for ecologically, recreationally, or commercially important fish or shellfish. The SEIS has been revised to include a brief description of this new data collection effort.*

Comment: Several places in Chapter 4 indicate that the Summers et. al. (1989) analysis advises that numbers produced by EA studies were underestimated. It is not obvious, when the GEIS discusses numbers of fish, invertebrates, plankton, etc., whether or not those numbers are based on EA's underestimated numbers or have been corrected to meet Summers estimates. (QQ-2)

Response: *The SEIS has been revised to clarify that the numbers used to assess impacts reflect the estimates of Summers et al. (1989). The source of information is also reflected in the table footnotes.*

Comment: In Appendix E, there is an evaluation of species requiring Essential Fish Habitat (EFH) consultation. The DLUR offers the following comments on the winter flounder (*Pseudopleuronectes americanus*) evaluation.

The evaluation (E58–59) states, "OCNGS operations have the potential to adversely affect EFH for all life stages of winter flounder because all stages could occur in Barnegat Bay. Tatham et

al. (1984) considered the winter flounder a resident species in Barnegat Bay that made significant use of the estuary for spawning and as a nursery area; the years of study (1975 to 1978) reflected a period when commercial landings in New Jersey waters ranged from 47.7 to 92.7 metric tons. These data appear to reflect a low point in the population based on data from 1979 to 2004, when catches usually exceeded 100 metric tons and were greater than 200 metric tons for seven years during that period (NMFS 2005). Winter flounder larvae represented between 1 and 10 percent of the annual OCNGS entrainment measured in studies from 1975 to 1981 (Summers et al. 1989)." ... "The total number of entrainment losses for winter flounder larvae for 1975 to 1976, 1977 to 1978, and 1980 to 1981 was 4330 million organisms (Summers et al. 1989)." ... "Winter flounder are also impinged on the OCNGS traveling screens. Annual impingement of winter flounder from 1975 to 1985 ranged from 8908 individuals in 1975 to 1976, to more than 148,000 individuals from 1978 to 1979, and the average annual impingement was estimated (EA 1986) to be 38,866 individuals during that period."

The Atlantic States Marine Fisheries Commission (<http://www.asmf.org/>) has published a more recent report (Fishery Management Report No. 43 of the Atlantic States Marine Fisheries Commission Amendment 1 to the Interstate Fishery Management Plan for Inshore Stocks of Winter Flounder November 2005) on winter flounder. This report places New Jersey within the Southern New England/Mid-Atlantic (SNE/MA) Management Area for winter flounder. The report encompasses a large area, including New Jersey. The report states that within the SNE/MA the stock complex is overfished and overfishing is occurring based on updated NEFMC overfishing definitions.

In addition, the report provides the following information. "Commercial landings from the SNE/MA stock unit averaged 8,500 mt from 1964-1972 before declining to around 4,800 mt throughout the mid- to late 1970s. Commercial landings increased in the early 1980s to a record high of 11,176 mt in 1981 and remained at high levels through 1985. Landings rapidly declined after 1985 and reached a record low of 2,200 mt in 1994. Commercial landings in 2001 were 4,400 mt. Landings by distance from shore (<3 miles; 3-12 miles; >3 miles) were unavailable for 1994-1996 because of the switch from the NEFSC's weigh-out system to the Vessel Trip Reports (logbooks). Commercial landings from the EEZ (>3 miles) averaged 86% of total commercial landings from 1989-1993, and the 2002 stock assessment notes that the majority of commercial landings from the SNE/MA stock continue to come from offshore areas (>3 miles)."

"Recreational landings from the SNE/MA stock complex peaked at 5,772 mt in 1984 before declining to 383 mt in 1992. Since 1992, landings have fluctuated without trend between 290 and 831 mt. In 2001, the recreational landings were estimated at 550 mt. Recreational landings as a percentage of total landings increased from 20% in 1982 to 44% in 1988, then declined to 20% in 1990. Recreational landings as a percentage of total landings have ranged from

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10-18% since 1997. On average, recreational landings have comprised 23% of the total landings (1981-2001)."

"In order to restore the stock, the states in the Southern New England/Mid-Atlantic stock area must implement a recreational 12" minimum size limit and a 10-fish creel limit. Each state in the SNE/MA stock area may have a 60-day open season for recreational winter flounder fishing. In addition, 20 days must be closed to recreational winter flounder fishing during March and April. The 60-day open season can be split into no more than two blocks. While recreational fishermen in states within the Gulf of Maine (GOM) Stock must maintain the existing 12" minimum size and adopt an 8-fish creel limit. There are no required recreational closed seasons in the GOM stock area."

"Commercial fishermen within the Southern New England/Mid-Atlantic stock area must implement a 12" minimum size limit, a minimum 6.5" square or diamond mesh in the cod-end, and maintain any existing seasonal closures. In addition, the mesh size regulation includes a 100 lb. trip limit for winter flounder if smaller mesh is being used. This 100 lb. "mesh trigger" provides for the landing of a small amount of winter flounder as bycatch in smaller-mesh fisheries. While commercial fishermen in the Gulf of Maine stock area must maintain the existing 12" minimum size limit and remain consistent with the adjacent EEZ mesh size regulations. The current mesh size in the EEZ adjacent to the states in the GOM stock area is a 6.5" diamond or square mesh in the cod-end. States must maintain existing season closures, including any Federal rolling closures that affect state waters in the GOM stock area."

Based on the above, it appears the winter flounder stock is in trouble in the SNE/MA and the Atlantic States Marine Fisheries Commission has taken measures to meet federal rebuilding requirements. This is somewhat of a different picture than presented in the GEIS.

It is interesting to note that Fishery Management Report No. 43, Section 1.4.1.3 entitled "Present Condition of Habitats and Habitat Areas of Particular Concern Status of the Habitat" presents three activities which have been identified as exerting long term deleterious effects on winter flounder and their habitat especially habitat areas of particular concern. They are: 1. Near-shore water quality degradation; 2. Suspended sediments; and 3. Entrainment and impingement from power plants and other activities."

With regard to entrainment and impingement from power plants and other activities, the Report states: "Several extensive studies have been done on the impact of coastal power plants on winter flounder. Historically, many of these plants have been sited in the upper reaches of the estuaries where many winter flounder populations spawn and nursery. Power plant losses through entrainment and impingement of different life history stages are directly related to several factors: the location of the plant on the estuary, the type of system used for cooling the plant, volume of water used in cooling, and the type of technology employed to reduce mortality. Entrainment impacts are usually associated with egg, larval and juvenile life stages where

individuals are small enough to pass through the intake screens and subsequently through the plant. Impingement affects mostly the adult stage, or the individuals large enough to be caught on the intake screens. Impingement mortality is typically lower as technologies have been developed and implemented to allow fish to be diverted from the cooling water and returned to the estuary alive. Mandatory monitoring programs required of the industry to assess the impact these plants have on fisheries resources and the estuarine environment have provided valuable data on winter flounder populations and have led to the development of new technologies to reduce power plant mortality on estuarine species. There are other types of activities that potentially have similar impacts such as desalinization and water treatment plants."

Section 5.3 of the report is entitled Recommended (Non-Mandatory) Management Measures. This Section discusses that the recommendations included below correspond to the threats to habitat areas of particular concern outlined in Section 1.4.1 above. State fishery agencies should actively intervene to the extent of their authority to ensure that federal, state, and local permitting agents are aware of the loss in winter flounder productivity associated with water quality degradation and habitat loss and give full consideration to the following recommendations.

Recommendation #3 addresses concerns regarding Impacts by Power Plants (in addition water intake from desalinization plants, and water treatment plants). These recommendations include:

"Either encourage closed system plants or assist industrial siting councils in siting new plants to avoid winter flounder spawning areas;

When existing plants renew their permits or upgrade their technology, encourage closed system plants or other best available technology to minimize plant induced mortality.

Assess cooling water entrainment/impingement mortality at existing plants on a stage-specific basis for both local and regional flounder populations and use this information to address these impacts."

As the evaluation relies on +20 year old impingement and entrainment data, the Division recommends the SEIS be updated to include the most recent findings on the state of winter flounder populations and State and federal government agency requirements and recommendations. In addition, the update should not attempt to minimize impacts by implying the impact is in the millions instead of billions (4330 million = 4.33 billion). (QQ-3)

Response: *Sections 2.2.5 and 4.1.1 of the SEIS were revised to include information from the more recent ASMFC document referred to in the comment. The remaining portions of the comment pertain to the NJPDES permit administered by the NJDEP and do not require SEIS revision. Regarding the EFH assessment, the NRC staff will respond directly to the NMFS's*

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conservation recommendations as part of the consultation process. Therefore, the final SEIS will not include revisions to the EFH assessment. However, NMFS's conservation recommendation and NRC's response are included in Appendix E to the final SEIS.

Comment: The GEIS should review the Fishery Management Plans for target species to insure the most recent information is utilized in the EFH assessments. The Division recommends review and inclusion of data from the websites of the various fishery management commissions and councils and the National Marine Fisheries Service (NMFS) website (<http://www.nefsc.noaa.gov/nefsc/habitat/efh/#list>) along with the results of the presently on-going impingement/entrainment studies. (QQ-4)

Response: *Fishery management plans for the target species were reviewed and incorporated into Sections 2.2.5 and 4.1.1 of the revised SEIS. Regarding the EFH assessment, the NRC staff will respond directly to the NMFS's conservation recommendations as part of the consultation process. Therefore, the final SEIS will not include revisions to the EFH assessment. However, NMFS's conservation recommendation and NRC's response are included in Appendix E to the final SEIS.*

Comment: Table 2-3 notation says that blue crab are a species known to be affected by the operations of the OCNGS, yet the text says blue crab are at sufficient numbers and 1995 was the largest harvest recorded since 1950. Can you clarify these statements? Are blue crabs impacted by the OCNGS and if so, to what degree? (QQ-6)

Response: *Blue crab early life stages (megalope and zoea) are susceptible to entrainment by the OCNGS cooling system, and juveniles and adults are commonly impinged. Although estimated annual losses due to entrainment of megalope and zoea exceed 150 million organisms, this number represents only a small fraction of total megalope and zoea production in the Bay. Blue crab juveniles and adults exhibit a high survivability after impingement, with greater than 87 percent survival occurring in studies conducted in support of the 316(a) and 316(b) studies (Summers et al. 1989). Summers et al. concluded that the overall impacts of entrainment and impingement did not threaten the protection or propagation of a balanced, indigenous population. The NRC staff recognizes that this information is not current.*

In characterizing the "species of special emphasis" associated with the Barnegat Bay Complex, the FWS (2006) has ranked the blue crab resource as "BW5," which indicates the "... species is demonstrably secure throughout the Bight [New York Bight watershed, which includes Barnegat Bay], though it may be quite rare or local in parts of the Bight, especially at the periphery of the species' range in the Bight. The species is generally determined to be common to abundant by both States in which it occurs, including within the Bight, and is in no danger of extirpation in either State portion of the watershed or in the open marine waters of the Bight."

The aquatic ecology impacts have been revised to include this information and to reflect the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. This impact assessment recognizes that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. The impact assessments for entrainment and impingement, have been revised to reflect this uncertainty.

Comment: What is the number and location of hard clam beds in Barnegat Bay? (QQ-7)

Response: *The most recent information on hard clam beds in Barnegat Bay can be found in Barnegat Bay National Estuary Program (BBNEP 2005). The NRC staff also contacted the NJDEP Division of Fish and Wildlife Bureau of Shellfisheries and was informed that the most recent survey in the area was conducted in 2001 in Little Egg Harbor in southern Barnegat Bay. There are no current surveys of clam beds in central Barnegat Bay. The comment provides no new and significant information; therefore, no change was made to the SEIS text.*

Comment: Eelgrass represents the most important submerged aquatic vegetation. How will the next dredging of Oyster Creek impact the eelgrass beds and what will be done to minimize the impact? What is the current assessment of the eelgrass beds? (QQ-8)

Response: *Prior to dredging, OCNGS would be required to obtain a permit from the U.S. Army Corps of Engineers (USACE). Impacts on eelgrass and other benthic resources would be considered by USACE prior to issuance of the permit, which could require implementation of mitigation measures to minimize impact. Eelgrass beds are discussed in Section 2.2.5.4 of the SEIS; however, there are no current assessments of the distribution and abundance of eelgrass beds in the Bay. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Barnegat Bay is an important natural resource that supports populations of commercially and recreationally significant fish, shellfish, and rare and endangered wildlife species, as well as serving as a vital component of New Jersey's tourist industry.[see <http://www.epa.gov/owow/estuaries/programs/barn.htm>]. The Bay is recognized by United States Environmental Protection Agency ("EPA") as one of 28 estuaries of "national significance." The fisheries (both fin and shellfish) of Barnegat Bay are an important economic resource: in 1991, freshwater and marine recreational fishing in New Jersey had a total economic impact of \$1.33 billion, which supported 16,754 jobs and generated \$630 million in retail sales to fishermen, \$402 million in salaries and wages, \$50 million in state tax revenues and \$46 million in federal income tax revenues. Oyster Creek, which flows into Barnegat Bay, "represents a high-use recreational fishery," as stated by then-New Jersey Department of Environmental Protection Commissioner Bradley Campbell [NJDEP Press Release: Oyster Creek Generating Station Fined for Water Violations and Fish Kill: NJDEP Seeks Compensation for Natural Resource Damages (Dec. 12, 2002)].

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It is widely acknowledged that Barnegat Bay is a severely stressed estuary. These stresses are reflected in declining natural resources. Under the National Environmental Policy Act (NEPA"), 42 U.S.C. 4321 et seq., the Nuclear Regulatory Commission ("NRC") is required to consider the environmental impact of the proposed re-licensing of the OCNGS for a period of twenty (20) years. Accordingly, the NRC must consider and disclose the ongoing damage to the marine environments of the Forked River, Oyster Creek, and Barnegat Bay caused by OCNGS. Additionally, the NRC must reevaluate the current conditions of operation of the OCNGS so that it might promote and advance the restoration and protection of this nationally significant estuary through the exercise of its authority; one of the purposes of NEPA (and by extension the NRC's obligations under it) is to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. 4321.

Indeed, a "hard look" at the environmental impacts of the OCNGS is mandated and warranted, particularly given its history of environmental abuses and the many forms of pollutants that emanate from the plant. Specifically, the OCNGS:

- impinges millions of organisms each year;
- kills hundreds of millions organisms each year by entrainment;
- has killed or impinged a significant number of endangered sea turtles;
- has caused several significant fish kills due to thermal shock;
- discharges into Oyster Creek an assortment of pollutants, including radionuclides, chlorine, suspended solids, heat, and petroleum hydrocarbons.

It is worth noting that all of these impacts or releases could be eliminated or greatly reduced if OCNGS replaced its antiquated once-through cooling system with a closed cycle cooling system, but the Applicant has resisted this federally mandate. (GG-1)

Response: *The SEIS recognizes the ecological importance of Barnegat Bay and provides a detailed description of Bay resources as gleaned from available literature. In addition, the SEIS presents the rates of entrainment and impingement at the existing OCNGS once-through cooling system and thermal effects of that system. The presentation of aquatic ecology impacts has been revised to reflect the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. The NRC staff did provide a "hard look" at the environmental impacts of OCNGS during the license renewal period using the best available information from a variety of sources. This impact assessment recognizes that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. Section 8.1 of the SEIS presents an evaluation of the effects of an alternative closed-cycle cooling system. This*

evaluation acknowledges that impacts on aquatic resources would be reduced if OCNGS converted to a closed-cycle cooling system. The text of the SEIS has been modified in response to this comment.

Comment: The Versar Report attempted to analyze the impacts of OCNGS operations on aquatic organisms using two available data sets, the JCPL 316(a) and (b) demonstration in 1975-1978, and the EA study of 1985. The Versar Report found significant problems with these data, forcing them to throw out large portions of the data sets and make numerous assumptions about the remaining information. The modeling and conclusions conducted in the Versar Report are therefore based on a very small data set that was riddled with inconsistencies and inaccuracies. **The Draft GEIS affirms the inaccuracy of these data and reports, but nevertheless uses them to justify a finding of SMALL impacts, which is both environmentally irresponsible and scientifically unacceptable.**

Some of the serious problems with the data that are noted by the Versar Report and are clearly acknowledged in the Draft GEIS, include:

- Best Methods Available were NOT used to determine the following impacts (most would have likely resulted in an underestimation of impacts):
 - Magnitude of Impingement losses
 - Annual Entrainment Losses
 - Avoidance Temperature/Thermal Plume Exclusion
 - Cold Shock/Heat Shock Mortality
 - Population/Community level Impacts of Plume on Fish and Invertebrates
 - Fish Kills associated with Heat/Cold Shock
 - Hydrodynamic Modeling;
- Population surveys of fish and invertebrates in the Barnegat Bay conducted in the 1970's and consequently used to determine the impact of losses due to OCNGS operations
 - Used inappropriate mesh sizes,
 - Did not calculate gear collection efficiencies,
 - Only surveyed during daytime,
 - Used inadequate sampling frequencies;
- Serious flaws in the methods used to determine entrainment losses, which would result in significant underestimation of losses [Id. Page IV-32.], including:
 - The use of only one of the discharge ports (despite differences in circulation pump operation between ports),
 - Use of discharge samples without any adjustment for mechanical destruction,
 - Sampling only from the condenser system, not the dilution pump system. Intake structures for these two systems are located at opposite sides of the intake canal and

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have different configurations, making differences in the number and types of organisms entrained likely;

- Entrainment losses were calculated assuming a sampling efficiency of 100%, when in fact they could have been as low as 13% due to extrusion and avoidance. Thus entrainment losses were most likely significantly underestimated [Id, Page IV-27.];
- Mortality estimates for entrainment losses were not determined for all "Representative Important Species" identified by the NRC;
- The only two impingement mortality studies available, conducted between 1975-1978 [JCPL (1978)] and in 1985 [EA (1986)], used different methods for determining immediate mortality rates. "Major differences in impingement studies among sampling years include:
 - the type of traveling screens,
 - the mode of screen wash operation,
 - the length of impingement sampling time,
 - the frequency of sampling,
 - the time of day at which samples were collected."
 - Adequate details on methodology were not provided
 - Identical test species were not used in all studies;
- Capture efficiency values "for annual impingement were also not corrected for intake screen collection efficiency" as they assumed 100% capture efficiency. When efficiency studies were finally performed in 1985, only one species was utilized and mean collection efficiencies were highly variable (90% in May and 53% in November). "Therefore, GPUN did not use best methods reasonably available for estimating screen efficiency
- Sampling gear deficiencies contributed to a significant underestimate of annual impingement mortality [Id. Page IV-19.];
- Thermal Plume avoidance area was substantially underestimated [Id. Page IV; -42]
- Hydrodynamic modeling "was a poor reflection of the dynamic conditions characterizing Barnegat Bay." And it "underestimated the size of the plume and its associated isotherms [Id, page IV-42]. (GG-8)

Response: *In conducting the environmental evaluation presented in the SEIS, the NRC used the best available information from a variety of sources, including the applicant's ER, data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. The revised SEIS acknowledges that some of the data available for review are 30 years old and that conclusions regarding current impact levels are uncertain. The conclusions in Sections 4.1 and 4.8.1 of the SEIS regarding impacts have been revised to reflect this uncertainty.*

Comment: The Draft GEIS also references the Draft NJPDES Permit prepared by the NJDEP. This document is not final and is still under review. Therefore, it is inappropriate and improper for the NRC to use this document to draw conclusions.

During the public comment period for the draft permit, the NJDEP received numerous and substantive criticisms of the data and analysis, including comments submitted by COA, ALS and many other concerned organizations and individuals (see attached letter, which is incorporated herein and is to be made part of the record).^(a) One important finding set forth in the Draft NJPDES Permit, was the clear statement that NJDEP "is concerned about both impingement and entrainment losses, but is particularly concerned about the entrainment losses and therefore are requiring changes to OCNGS operations. As stated therein, NJDEP's preferred alternative is to "[r]educe intake capacity to a level commensurate with the use of a closed-cycle, recirculating cooling system [Id]. **Indeed, these and several other statements by NJDEP in the Draft NJPDES Permit, have resulted in a NJDEP finding of significant impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems. These important conclusions directly and irreconcilably contradict the finding of SMALL environmental impacts set forth in the Draft GEIS.** (GG-9)

Response: *The draft NJPDES permit, including the accompanying fact sheet, was used in the SEIS because it represents important information pertinent to operations of OCNGS. The resulting final permit may set operating standards for at least a portion of the license renewal period. Because the NRC cannot presume the outcome of that ongoing permitting process, the NRC staff used information in the draft permit to evaluate the impacts associated with the present once-through cooling system as well as alternatives to the existing system that were identified in that draft permit.*

In conducting the environmental evaluation presented in the SEIS, the NRC used the best available information from a variety of sources, including the applicant's ER, data and information collected during a site audit, information provided by local, State, and other Federal agencies, and published scientific literature. The revised SEIS acknowledges that some of the data available for review are not current and that conclusions regarding current impact levels are uncertain. The conclusions regarding impacts have been revised to reflect this uncertainty.

Comment: The Draft GEIS is incomplete because it does not evaluate several relatively new conditions in the Barnegat Bay system. All natural systems are dynamic, exhibiting constant change in biotic and abiotic factors over time, and the Barnegat Bay estuary is no exception. There have been substantial ecological changes within the Barnegat Bay estuary since the

(a) Attachments referred to in the comment are not included in the SEIS. They are available for download from NRC's ADAMS website at <http://www.nrc.gov/reading-rm/adams/web-based.html> under accession number ML062610244.

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1970's when the only bay-wide benthic and fisheries survey studies were conducted by OCNGS in the Barnegat Bay, including:

- The presence of substantial and persistent algal blooms of the species *Aureococcus anophagefferens* [Gastrich et al. (2004) Assessment of Brown Tide Blooms, caused by *Aureococcus anophagefferens*, and contributing factors in New Jersey Coastal Bays: 2000-2002. Harmful Algae, Vol. 3, pp. 305-320],
- An increase in macro-algal blooms [Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005],
- A significant decline in the extent of seagrass between the late 1970's and the mid-1990's, resulting in the reduction of essential fish habitat and the potential loss of commercially and recreationally important species [Id.]
- Hydrologic changes including substantial reduction in base-flow of freshwater in the Barnegat Bay since the mid-1980's [Id],
- Increased eutrophication, [M.J. Kennish (2001 Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280),
- Benthic community shift from a community dominated by filter-feeders to a deposit-feeder dominated benthic community, [Michael Kennish, personal communication, July 27, 2006]
- New alignment of the South Jetty of the Barnegat Bay Inlet in 1991,
- Significant dredging and deepening of the Barnegat Bay Inlet from 1991-1993,
- Development has almost doubled since 1972 to 30% of the Barnegat Bay watershed in 2001 [Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005]

These changes are significant enough to impact fish and invertebrate populations in the Barnegat Bay and the impact of the substantial losses of aquatic organisms from the continued operation of OCNGS must be evaluated based on these present conditions. The Draft GEIS lists these changes, but does not evaluate the impacts of plant operations based on these new conditions in the Bay, as required.

Moreover, an adequate estimation of the plant's current impacts simply cannot be determined without concurrent monitoring of both OCNGS induced losses and bay-wide population surveys.

Therefore, the Draft GEIS is inappropriately narrow in considering the environmental context used to reach its determination of SMALL impacts. (GG-11)

Response: *It is not possible to quantitatively evaluate the environmental stressors listed in the comment because there are no recent biological monitoring data from Barnegat Bay. However, these stressors have been evaluated qualitatively and are discussed in Section 4.8 of the SEIS. This section has been revised to reflect the lack of current monitoring and the need for data to determine the relative contribution and importance of OCNGS effects relative to other stressors affecting resources in Barnegat Bay. Section 4.1 of the SEIS has been revised to reflect the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. This impact assessment acknowledges that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. The text of the SEIS has been modified in response to this comment.*

Comment: The Draft GEIS contains a finding that discharges of chlorine are not expected to be a problem during the twenty (20) year license renewal period. The basis of this conclusion is not readily apparent, but is clearly not a scientific one. The substantial, negative impacts of chlorine and its byproducts have been consistently documented in the scientific literature and therefore need to be addressed in this GEIS. Chlorine is injected through each of the circulating pumps daily to prevent and remove fouling organisms such as bacteria. Maximum chlorination occurs in the summer months to account for more rapid growth of fouling organisms. To their detriment, fish, fish eggs and larvae, invertebrates, and zooplankton are most abundant during this time of increased chlorination. Some of the impacts related to chlorine and the chlorination process at OCNGS are detailed below.

- (1) Chlorine directly kills phytoplankton and zooplankton entrained in the cooling system and can impact organisms residing in Oyster Creek and surrounding waters.
- (2) Chlorine begins to be lethal to marine organisms at 0.01 mg/L [J.S. Mattice and H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. Journal of Water Pollution Control Federation, 48: 2284-2292] but tolerance is significantly lowered by high temperatures and physiological condition of the organisms [L.W. Hall Jr., D.T. Burton and S.L Margrey (1981) Acclimation temperature: an important factor in power plant chlorination studies with larval white perch, *Morone americana*. Journal of Toxicological and Environmental Health. 7(6): 941-950].
- (3) OCNGS has a permitted daily maximum discharge limit of 0.20 mg/L of chlorine produced oxidants (CPOs) [Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C] into the discharge canal, 20 times higher than the lethal chlorine limit of many estuarine organisms including striped bass, mummichogs, and bunker [J.S. Mattice and

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H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. *Journal of Water Pollution Control Federation*, 48: 2284-2292], [W.P. Davis and D.P. Middaugh (1977) A revised review of the impact of chlorination processes upon marine ecosystems: update 1977. In: R.L. Jolley (eds) *Water Chlorination: Environmental Impact and Health Effects-Volume 1*, Ann Arbor Science, Ann Arbor, Michigan, pgs. 283-310]. One chlorine related fish kill resulted in the death of 500 Atlantic Menhaden in January of 1974 [M.J. Kennish (2001) *State of the Estuary and Watershed: An Overview*. *Journal of Coastal Research*, SI 32: 243-273].

- (4) Toxic residual organic compounds (chloramines), a byproduct of chlorination, persist in the discharge canal and effluent resulting in long-term exposure to fish and other aquatic organisms residing in the canal and plume area of Oyster Creek and Barnegat Bay [Ambient Water Quality Criteria for Chlorine (January 1985), USEPA 440/5-84-030, 57 pgs].

In addition to chlorine discharges, the current NJPDES permit for OCNGS provides that a maximum daily limit of 15 ppm of petroleum hydrocarbons that can be discharged from five (of seven) of their outfall pipes [Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.]. The sources of this contaminant are not clear, however, petroleum hydrocarbons are harmful to marine life. These impacts should have been more thoroughly evaluated in the Draft GEIS.

Small concentrations of sediments and other solids are sucked through and discharged from OCNGS. Depending on the amount, total suspended solids (TSS) and total dissolved solids (TDS) can have negative impacts due to increased turbidity and solids concentrations in surrounding waters. After forty (possibly sixty, should the license be renewed) years of operation, TSS and TDS can have significant adverse effects on the marine environment, especially if the sediment is contaminated with radionuclides. These impacts should have been more thoroughly evaluated in the Draft GEIS.

The above individual impacts must also be examined from an ecosystem perspective, including cumulative effects, to fully appreciate the overall effect of OCNGS on the surrounding habitat. For example, survivability of fish populations and their effects on fish stocks and the effects on the ecosystem.

Because of the above demonstrable, significant, adverse impacts to the waters of New Jersey and their resources, and the fact that no studies have been conducted to determine the impacts of these ongoing releases to aquatic organisms, *the NRC lacks evidence to conclude that these discharges will have "no impact" during the renewal period and beyond.* (GG-14)

Response: *According to Section 4.2.1.2.4 of the GEIS, the "impacts of chemical discharges to water quality are considered to be of small significance if discharges are within effluent*

limitations designed to ensure protection of water quality and if ongoing discharges have not resulted in adverse effects on aquatic biota.” No new and significant information has been identified, and the NRC staff concludes that there would be no impacts during the license renewal term that are beyond those described in the GEIS. Discharge of biocides, including chlorine, is regulated under the NJPDES permit. OCNGS is currently in compliance with the discharge limits specified in the permit and is expected to continue to maintain compliance. The response concerning chlorine toxicity is correct, but fails to account for the instantaneous dilution of this compound when it enters the discharge canal. Total suspended solids and petroleum hydrocarbon monitoring is also a component of the NJPDES permit, and the NRC staff assumes that the limits set are consistent with environmental protection. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: The marine impacts of once-through cooling systems are well documented across the country and far more damaging than initially thought. Waste water with significant concentrations of chlorine (595,500,000 gpd flow rate) and elevated temperatures by approximately 25% is discharged into Barnegat Bay, which is a registered U.S. protected estuary. Among the concerns which the EPA has identified for Barnegat Bay, degraded water quality, changes in abundance and diversity, closure of shellfish beds and loss of submerged vegetation can be at least partially attributed to the operations of OCNGS. Because Barnegat Bay is shallow estuary with limited tidal flushing, it is particularly sensitive to impacts and inputs, natural or anthropogenic. Its ecosystem balance is dependent upon the interchange of fresh and salt water and warm and cool water, making for rich biodiversity that is commercially, recreationally and ecologically important to the region. The operations of OCNGS have already incurred substantial loss of habitat in the estuary, and continued operation promises to further the ecological disturbance to the area during the renewal period. (EE-11)

Response: *Section 2.2.5 of the SEIS presents a detailed description of aquatic resources in the vicinity of OCNGS, in general, and Barnegat Bay, in particular. Section 4.1 of the SEIS presents the NRC staff’s evaluation of the impacts of the OCNGS once-through cooling system. The cumulative impacts on aquatic resources (including those in Barnegat Bay) are presented in Section 4.8.1. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The NRC’s conclusions that impacts of both entrainment and impingement are SMALL is fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay estuary since these data were collected and lack of analysis on cumulative impacts. These issues were fully evaluated in Section A of this comment letter.

We further note that the Draft GEIS does not appear to evaluate in any depth the immense Biological Oxygen Demand (BOD) loadings into the Barnegat Bay system from OCNGS. The

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organic loading discharged back into the Bay from the remains of entrained aquatic life averaged 17,000 lbs of oxygen demand per day during the summer months [C. O'Neil, D. Doyle, O. Donovan and E. Kearns. Biochemical Oxygen Demand (BOD) as a Measure of Entrainment Loss at a Nuclear Power Station. The Bulletin of the American Littoral Society. Volume 10, Number 3 (July 1977)]. This daily BOD loading is equivalent to that of sewage treatment plant having a daily capacity of 25 million gallons. As this material decomposes, oxygen is removed from the Bay waters, contributing to and creating hypoxic conditions. This is a significant environmental impact that should have been evaluated in the Draft GEIS. (GG-15)

Response: *The presentation of aquatic ecology impacts in the SEIS has been revised to reflect the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. This impact assessment acknowledges that because there are no recent monitoring data, the conditions that existed during the 316(a) and 316(b) studies may or may not exist today. During the NRC staff's review, biochemical oxygen demand (BOD) monitoring data were not available for the OCNCS discharge, Oyster Creek, or Barnegat Bay. However, there is no indication that there has ever been a problem with BOD in Oyster Creek or in adjacent portions of Barnegat Bay. In addition, the NRC staff is unaware of any studies that indicate that the mortalities associated with entrainment would be sufficient to result in BOD problems in the receiving waters at operating power plants. A study conducted from 1976 to 1980 in Barnegat Bay (Vouglitois 1983) measured water chemistry (including dissolved oxygen) at the mouths of several creeks that are tributaries to Barnegat Bay, including Forked River and Oyster Creek. This study found no statistically significant differences between dissolved oxygen at any of the sampling locations, indicating that OCNCS was not noticeably affecting dissolved oxygen content in either Oyster Creek, Forked River, or adjacent portions of Barnegat Bay.*

Since 2005, the NJDEP has maintained two real-time water quality monitoring buoys in Barnegat Bay at Seaside Park and Tuckerton (NJDEP 2006b). Each buoy is equipped with sensors to measure water temperature, salinity, dissolved oxygen, pH, turbidity, and chlorophyll a. Because high BOD demand would reduce dissolved oxygen content, examination of dissolved oxygen trends can be helpful in assessing the impact of BOD. Data from the Seaside and Tuckerton buoys indicate that the dissolved oxygen levels at these locations are sufficient to maintain marine life, suggesting the general trends in the bay do not reflect high BOD loading. The text of the SEIS was modified in response to this comment.

Comment: As was stated above, the Draft NJPDES Permit referred to in this section has not yet been finalized. The current, expired NJPDES permit allows for a temperature differential of 22°F (33°F under special circumstances) between the intake and discharge canal. Water temperature in the discharge canal is permitted to reach 110°F, which affects the behavior, physiology, and habitat utilization of aquatic organisms in Oyster Creek and Barnegat Bay. In the Draft GEIS, outdated and scientifically flawed data are once again utilized to reach the conclusions of (1) SMALL impacts to aquatic organisms due to heat shock, (2) NO IMPACT of

the thermal plume on distribution of aquatic organisms and (3) NO IMPACTS of losses from predation, parasitism, and disease among organisms exposed to sublethal stressors. There are significant data available on the impacts of OCNCS' thermal plume on local organisms, none of which are referenced in the Draft GEIS.

The elevated temperature in Oyster Creek and the surrounding waters of Barnegat Bay induces behavioral changes that have been documented in important managed species such as bluefish, fluke, winter flounder, and tautogs [O. Donovan, D. Doyle, C. O'Neill and E. Kearns (1977) Thermal Plume Impact on Fish Distributions in Barnegat Bay. Bull. Amer. Lit. Soc. 10(3): 14]. Some of these behavioral changes include

- a) Avoidance of parts or all of Oyster Creek by certain species during summer and early fall [M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273].
- b) Attraction to parts or all of Oyster Creek during winter when they should have migrated out of the area due to cold temperatures. Failure to migrate can lead to large-scale mortality (due to thermal shock) when the plant experiences a planned or emergency shut down.
 - (1) Records from January 1972 through December 1982 reported 2,404,496 fish were killed due to thermal shock including Atlantic menhaden, bay anchovy, bluefish, striped bass, and weakfish [M.J. Kennish, M.B. Roche and T.R. Tatham (1984) Anthropogenic effects on aquatic organisms. In: M.J. Kennish and R.A. Lutz (eds), Ecology of Barnegat Bay, New Jersey. NY: Springer-Verlag, pp. 318-338].
 - (2) An emergency shutdown on January 21, 2000 caused a 17°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 32°F resulted in the death of approximately 3500 fish including 2980 striped bass [Oyster Creek Nuclear Generating Station Fish Kill Monitoring Report (January 2000) NRC ML#003684420].
 - (3) An emergency shutdown on November 11, 2001 caused a 7°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 48°F resulted in the death of approximately 1407 fish [Oyster Creek 2001 Annual Environmental Operating Report (February 2002) NRC ML#020660222].
 - (4) A scheduled shutdown on September 23, 2002 caused the water in the discharge canal to increase to 101°F in less than an hour and resulted in the death of approximately 6,000 fish [A. Cradic, Oyster Creek Generating Station fined for water violations and fish kills: DEP seeks compensation for Natural Resources Damages New Jersey Department of Environmental Protection news release (December 12, 2002), available

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for viewing at http://www.state.nj.us/dep/newsrel/releases/02_0131.htm] AmerGen reached a settlement of approximately \$1 million dollars over this incident.

- c) Metabolic rate of organisms increases with increased temperatures resulting in decreased growth and survival, [T. L. Beiting, W. A. Bennett, R. and W. McCauley, (2000) Temperature Tolerances of North American Freshwater Fishes Exposed to Dynamic Changes in Temperature. Environmental Biology of Fishes, 58(3):237 – 275] especially during summer months when ambient water temperatures are at their peak.
- d) High water temperature decreases oxygen solubility in water and increases Biological Oxygen Demand ("BOD") resulting in dangerously low dissolved oxygen concentrations in the water.
- e) Calefaction or thermal loading in the discharge canal and Oyster Creek directly interferes with physiological processes of biota, such as enzyme activity, feeding, reproduction, respiration, and photosynthesis. Less conspicuous, indirect effects, which are difficult to quantify, include greater vulnerability to disease, to changing gaseous solubilities, and to chemical toxicants associated with thermal enrichment.

Both the NJDEP draft permit and Versar Report found that the extent and width of the thermal plume often violates New Jersey surface water quality standards. These violations should automatically disqualify any finding of SMALL impact, because these standards are essential for the protection and propagation of aquatic life in the Barnegat Bay estuary. We further note that in other sections of the Draft GEIS, violations of state or federal standards are considered as MODERATE impacts. (GG-16)

Response: *The citations mentioned in the comment were reviewed during preparation of the SEIS, and the thermal effects, including referenced historic fish kills, were reported in the SEIS. The SEIS has been revised to present separately the potential for adverse impacts at near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) and far-field (central Barnegat Bay) locations. The revised impact assessment recognizes the decline in frequency of fish kills due to the thermal discharge, the lack of recent data on impingement and entrainment rates, as well as limited availability of information on the current state of ecological resources in Barnegat Bay. Comments on BOD resulting in low dissolved oxygen concentrations and the physiological changes in biota due to the thermal discharge are assertions unsupported with data from Barnegat Bay. Nevertheless, the lack of recent data results in some uncertainty regarding the impacts of continued OCNGS operations under the 20-year license renewal term. The SEIS was revised to reflect that uncertainty.*

Comment: We are also concerned with the impacts to the Oyster Creek and Forked River aquatic systems from heat shock and the lack of a consistency determination with New Jersey's Coastal Zone Management Plan. (HH-2)

Comment: Since OCNGS began operation there have been a number of significant fish kills in Oyster Creek and Barnegat Bay due to heat shock. Unfortunately, with the exception of the fish kill documentation and the subsequent monitoring that was required by NJDEP, there have been no recent studies that examine the long-term effects of heated water entering a small, confined system such as the discharge canal and Oyster creek. Also, there is a question as to whether the thermal plume has a greater effect on Barnegat Bay than has been suspected. We strongly recommend that new and current studies should be done for representative species and those results be presented in the final SEIS. The studies should address the less conspicuous ability of heat to preclude the use of affected areas by temperature sensitive species, attract and expose organisms to areas of elevated temperature during spawning periods, and expose eggs and larvae to water temperatures far exceeding naturally ambient levels.

The draft SEIS also contains the conclusion that the potential impacts to fish and shellfish due to heat shock are small. As we have stated before, we believe that these kinds of conclusions are premature, particularly in this instance where current studies to determine the significance of the impact need to be done. The final SEIS should refrain from that terminology until that has been proven to be the case. (HH-13)

Comment: We are concerned that OCNGS does not have a federal consistency determination demonstrating compliance with New Jersey's Coastal Zone Management Plan. The draft SEIS did not discuss the contents of the consistency determination or the reasons for its rejection by NJDEP other than to say that the application was found to be incomplete. Oyster Creek should have a federal coastal zone management plan consistency determination for inclusion in the final SEIS or at the least in the Record of Decision. (HH-14)

Response: *The NRC staff acknowledges that portions of the discharge canal and Oyster Creek may be adversely affected by the thermal plume, but over the last 30 years, the biota of these water bodies have accommodated to the elevated temperature. Many marine and estuarine organisms are highly mobile and seek out optimal temperatures. Those that do not can be adversely affected. The impacts of heat shock are discussed in Section 4.1.3 of the SEIS. This section has been revised to separate near-field (Oyster Creek, Forked River, and adjacent portions of Barnegat Bay) effects from far-field (central Barnegat Bay) effects, and recognizes the decline in the frequency of fish kills due to the thermal discharge. In addition, alternatives to the OCNGS once-through cooling system that would reduce thermal effects are considered in Section 8.1 of the SEIS. The Coastal Zone Management Act consistency determination has not yet been finalized, but Section 2.2.1 of the SEIS has been revised to update the current status of the consistency determination.*

Comment: We also recommend that the final SEIS not view entrainment and impingement as mutually exclusive impacts, but instead assess the combined effects of entrainment and

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impingement, particularly since both impacts substantially affect a discrete number of species. (HH-12)

Response: *Entrainment and impingement are treated separately in Section 4.1 of the SEIS, but the cumulative effects of the two stressors combined, along with other stressors are presented in Section 4.8.1. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: As I said before, Oyster Creek sponsored and installed an artificial reef in the ocean working with the DEP, 3.1 miles out. That's a good thing, but I heard some people earlier today purported to be environmentalists dismissing that as not important. I disagree with that. (M-3; S-5)

Comment: At Oyster Creek we work hard to protect the environment, including Barnegat Bay. On a day-to-day, hour-to-hour basis, we monitor water temperatures and regularly take water samples to insure safety. We coordinate any plant load reductions or shutdowns to avoid any risk to marine life. This is a costly practice, but it's essential for us to meet our commitment to the environment. (M-5; S-7)

Comment: I'm most proud, however, of our efforts this past winter when plant conditions forced us to shut the plant down for maintenance. We recognize that our shutdown would threaten the nonindigenous fish species that enjoy our discharge. In order to reduce any possible impact at significant time and money spent, we implemented a supplemental heating system in the discharge canal which maintained the environment to save those fish. (Z-2)

Comment: I was the project manager that worked on keeping the fish warm last winter, and I spent a couple hundred thousand dollars of our company's money keeping those fish warm. I know everybody thinks that the fish kill is about heating them up. No, it's not. The fish kill is all of these tropical fish that stick around in the wintertime. They should have gone south, but they didn't, but they stick around because we have this warm water, and if we need to shut down for maintenance in the wintertime, we've got a big problem, you know. The water on our discharge cools down to the same temperature as Barnegat Bay, and a good number of these species can't live at that temperature. So if we don't do some way to provide supplemental heat, they ain't going to make it. So anyway, I was the project manager. I had a lot of fun with that, a lot of sleepless nights and days making sure that that went okay, but I was real pleased with the support that the company provided around that. (AA-2)

Response: *The comments refer to actions taken by AmerGen to mitigate environmental impacts of OCNCS operations. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Terrestrial Ecology

Comment: Does NRC take the position that simply because the use of herbicides to maintain the transmission lines is permitted, that there is no impact? (2-16) Did NRC consider the ongoing impact of the use of these poisons on the water, plant and wildlife on or near the Facility? (MM-18)

Response: *The use of herbicides for vegetation management in utility rights-of-way under regulated and controlled practices by licensed applicators are not considered to pose harm to surrounding waters, plants, or wildlife. The approved herbicides are applied selectively (not broadcast) to small areas or individual plants. In addition, the chemicals have a very short life-span or active period once applied (usually on the order of hours, but less than a day) and do not affect animals. In addition, herbicide use is not permitted on lands under the jurisdiction of the Pineland Commission. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The DEIS notes that (2-57) waterfowl congregate around open water created by thermal discharge plume. Is this a good thing? How does this change or affect migratory patterns? Is this not an impact? (MM-48)

Response: *While there is slight warming of Barnegat Bay near the mouth of Oyster Creek, the effect on migratory waterfowl during late fall and winter is too small to detect. Migratory birds, especially waterfowl, use the entire Barnegat Bay estuary during the late fall and winter and do not specifically concentrate near the warmer waters. The location of waterfowl is primarily determined by the presence of baywide food sources and the location of the large ice-free areas of Barnegat Bay. For example, the FWS states that during the fall and winter “dabbling ducks such as mallard, which feed on plants and some animals, occur throughout this system; diving ducks, including canvasback and scaup, which rely largely on bivalve mollusks and gastropods for food, are found primarily in the deeper open water habitats where bottom sediments are rich in this food base. Some known concentration areas include rafts of canvasbacks in Silver Bay, concentrations of waterfowl around West Point Island, and concentrations of American black ducks around Sedge Island and the backshore of Island Beach.” (FWS 1997). The text of the SEIS has been modified in response to this comment.*

General Ecology

Comment: While impacts to some species are mentioned there is no accounting for the loss of various early life stage aquatic organisms and the loss of migratory birds and other terrestrial species cause as direct or indirect impacts to the plant and/or the transmission lines associated with the development. It is the DFW's position that some type of mitigation is required for these past negative impacts and for any future impacts arising from the granting of re-licensing. The DFW suggests that as part of the relicensing process an estuary enhancement program should

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be developed and implemented to mitigate for these past cumulative impacts and future impacts.

Estuary Enhancement Program Design

If an estuary enhancement program is developed, the DFW suggests that the following areas should be included into any mitigation plan:

1. Areas of potential restoration should be identified and slated for a program similar in design to the PSEG Estuary Enhancement Program. The DFW realizes that the potential for restoration is much more limited in the area of Barnegat Bay as compared to the Delaware Bay. All areas of marsh dominated with *Phragmites australis* or where hydrology may be restored to provide salt marsh habitat as part of the overall plan.
2. Work with the DFW's Bureau of Freshwater Fisheries to provide anadromous fish ladders at Manahawkin and Pohatcong Lakes and provide low flow fish passage at other low head dams located within the Barnegat Bay estuary.
3. Create a project within the Conserve Wildlife Foundation of NJ with a goal of being able to assess the use of Barnegat Bay and adjacent offshore areas by marine turtles, marine mammals and seals. Develop specific recommendations for their conservation in this area including measures for avoidance and/or minimization of cooling water intake losses. It appears as though many of the turtles reported at the plant come in during high easterly winds and/or drops in temperature (either the day before or day of capture). A modeling project could be developed to look at these factors, along with variables such as proximity of the Gulf Stream, to predict the times when turtles are most likely to be impinged. The plant should institute increased surveillance, including more frequent examination of the trash racks and canals (even include boat surveys), when turtles are most likely to be present.
4. Provide funding to the DFW's ENSP Bureau to evaluate the use of Right of Ways (ROWs) by Pineland snakes and federally protected avian species and develop specific recommendations for how ROWs can be managed within the Pinelands to benefit these species.
5. Work with DFW on the restoration, preservation and mapping of submerged aquatic vegetation within Barnegat Bay.
6. Conduct a finfish inventory of Barnegat Bay for all life stages. This inventory would be of value for the development of baseline data to be better to assess positive and/or negative impacts of future actions.

7. Provide financial support on a yearly basis of the hard clam restoration project mentioned under Page 4-11 with consideration being given to including bay scallops as technology develops.
8. Financial support should be provided to the DFW to assist with funding for the Sedge Island Marine Conservation Zone educational programs.
9. Public Access - fishing, boat ramps, shoreline boardwalks and fishing piers (handicap accessible).
10. Provide additional funding for Artificial Reef projects expenses (vessel cleaning, procuring reef material, etc.).
11. Provide funding support for Clean Vessel Act pump out facilities/education.
12. Provide funding support for Youth fishing programs like HOFNODS. (PP-26)

Response: *The NRC's role in the NEPA process is to evaluate the effects of continued operations of OCNGS over the 20-year license renewal period. The actual requirements for mitigation are determined between the licensee and State agencies with jurisdiction over the affected resource. As a Federal agency, the NRC does consult with other Federal agencies regarding the mitigation of impacts regulated by Federal laws. For example, the NRC is involved in consultations required by the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA) among others. Some of the elements mentioned in the comment are related to alternatives to the once-through cooling-water system proposed by the NJDEP in a recent draft NJPDES permit. The NRC does not have the jurisdiction to require mitigation of impacts, which is the responsibility of the state of New Jersey. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The operation of Oyster Creek Nuclear Generating Station near the shores of Barnegat Bay is a matter of great public concern. The Bay is a public resource that is valued by the community for its wildlife, aesthetic values, and for fishing, boating and other recreational activities. Millions of dollars in public resources have been devoted to restoring the ecological health of the Bay. In 1987, Congress recognized the vital importance of estuaries and amended the Clean Water Act to create the National Estuary Program ("Program"). Clean Water Act Section 320, 33 U.S.C. Section 1330. In 1995, the Administrator of the Environmental Protection Agency accepted Barnegat Bay into the Program. Today, Barnegat Bay is one of 28 estuaries of "national significance."

In addition to its location near the Bay, the Facility is situated within the Pinelands Preservation Area. It is classified as a United States Biosphere Reserve and in 1978 it was established by

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Congress as the country's first National Reserve. This internationally important ecological region is 1.1 million acres in size and occupies 22% of New Jersey's land area. It is the largest body of open space on the Mid-Atlantic seaboard between Richmond, Virginia and Boston, Massachusetts and is underlain by aquifers containing 17 trillion gallons of some of the purest water in the land. These aquifers provide virtually all of the drinking water for the residents of southern New Jersey.

From the time construction began in the mid-1960s, when the local ecosystem was destroyed to make way for the Facility and its intake and discharge canals, to the present day, the Facility has had a significant, adverse affect on the environment. (MM-1)

Response: *The comment describes the importance and recognition of the ecological resources in the vicinity of OCNGS. These resources are described in Chapter 2 of the SEIS, and the direct, indirect, and cumulative impacts of continued operations over a 20-year license renewal period are discussed in Chapter 4. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The U.S. Department of the Interior (Department) has reviewed the Draft Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants (NUREG-1437, Supplement 28) regarding Oyster Creek Nuclear Generating Station. The Department's U.S. Fish and Wildlife Service (Service) commented in response to the Nuclear Regulatory Commission's Notice of Intent to prepare an Environmental Impact Statement for the proposed project in a letter dated November 23, 2005. The comment letter has been incorporated into the subject document in its entirety in Appendix E (pp. E-22 through E-31). Specific passages in the Comments section (Appendix A) are referenced by Commenter Identifier, OS-AJ.

We have no further comments on the GEIS. (WW-1)

Response: *The comment acknowledges that comments sent by the FWS during the public scoping period were incorporated into the draft SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Threatened and Endangered Species

Comment: NRC has failed to fully implement the Endangered Species Act. NRC we saw tonight has stated that the Draft Supplemental Environmental Impact Statement on 20-year additional extension of Oyster Creek and its once through cooling system is small in environmental consequence. Oyster Creek nuclear power station draws in more than 1.5 billion gallons of water per day to cool the nuclear reactor, and that superheated water is discharged to Barnegat Bay. In fact, it is well documented that Oyster Creek and its once-through cooling system is a large marine predator where it is capturing not only biota, life-supporting biota of the

marine environment, but it's also all [on?] the way to the capture and killing of endangered sea turtles first reported in 1992. In fact, the heated discharge is attracting sea turtles into Barnegat Bay and into the reactor cooling intake system, and there they are entrapped, these rare animals, on debris screens where they are being injured and are routinely suffocated under water when not promptly rescued and resuscitated.

In 2004, Oyster Creek captured eight of the world's most endangered species of sea turtles, the Kemp's ridley. Three of these rare turtles were recovered dead. The other five were recovered alive. The captures, all within several months of each other, were also a record breaker for the nuclear power station and in violation of Oyster Creek's incidental take statement, which is required under the Endangered Species Act.

The reactor's previous limit was set in 2001 by a Biological Opinion established by the National Marine Fisheries Service to permit no more than five live captures and three lethal takes of this species. Even this limit was raised from the original 1995 Biological Opinion which had set the limit for a single Kemp's ridley. Now, this is just the Kemp's that we're talking about, but on September 22nd, 2005, after consultation with NRC, the National Marine Fisheries Service again raise Oyster Creek's incidental take statement to now a total take of eight Kemp's ridley, four lethal captures on the water intake screens.

Since Oyster Creek first started operating and reporting, we've noticed that there's a pattern of the operator, the Nuclear Regulatory Commission, and the Marine Fisheries Service all working together to revise the incidental take statements consistently upward. NIRS contends that this trend is not based on best available scientific data as required by Section 7 of the Endangered Species Act, but instead rather reflects the capitulation of the NRC and the National Marine Fisheries Service to the nuclear industry agenda. NMFS has a practice of revising the ITS upwards in response to requests by NRC without conducting a serious scrutiny of the total amount of such taking and how it may affect sea turtle populations as broadly defined by the Endangered Species Act to include killing, injuring and harassing, which is inconsistent with the overall ability of the species to survive and recover.

Both NRC and NMFS have employed an overly narrow definition of taking in issuing these incidental take statements by focusing almost exclusively on the numbers of turtles that are killed by the once-through cooling system and disregarding to the extent which the animals are being harassed as defined in the Endangered Species Acts to encompass, quote, "...any additional and negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns, which include, but are limited to breeding, feeding or sheltering." And that's in the Code of Federal Regulation. This would include attracting the endangered sea turtles away from less hazardous areas where the animals would otherwise engage in normal feeding and sheltering, but this appear to have been inadequately addressed in either the Biological Opinion or this Environmental Impact Statement.

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Let me just close by saying that Section A(1) of the Endangered Species Act provides that all Federal agencies, quote, “..shall in consultation with and the assistance of the National Marine Fisheries Service or the FWS utilize their authorities in furtherance of any purpose of this chapter by carrying out programs for the conservation of endangered species and threatened species.” NIRS calls into question that NRC has complied with this obligation to protect endangered species, particularly sea turtles with this submission of the EIS, especially since there is an available reasonable alternative that would demonstrably reduce the documented adverse effects of power plant operations on endangered species, basically going to the dry cooling system. To the contrary, NRC has consistently chosen to protect Oyster Creek from adopting a nondestructive cooling system by accommodating the continued destructive operation of the current once through cooling system with a license to kill more Federally protected endangered species. As such, given the operation of Oyster Creek once through cooling system would continue to attract sea turtles and kill and injure and harass endangered species over the license extension period. NIRS contends that NRC is not utilizing its authorities in furtherance of the conservation purposes of the Endangered Species Act. (N-2)

Response: *The NRC staff has consistently discharged its responsibilities under the ESA in a timely and complete manner. We defer to the expertise of the NMFS in interpreting the meaning of the term “harassment,” and assume that the Biological Opinions (BO) issued by the NMFS is protective of the species under consideration. Although the incidental take limit for the Kemp’s ridley sea turtle was raised in 2005, the limits for the other sea turtle species potentially affected by OCNGS operations were lowered. The NRC staff recently received a new BO dated November 21, 2006, from the NMFS which again changes the turtle limits. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: OCNGS has significant impacts on aquatic species, including endangered and threatened species. Plant records indicate 34 impingements and 14 mortalities of endangered sea turtles since 1992. These data include the following species-specific incidents:

- 23 impinged Kemp's Ridley Sea Turtles with nine (9) mortalities,
- Seven (7) impinged Loggerhead Sea Turtles with two (2) mortalities, and
- Four (4) impinged Green Sea Turtles with one (1) mortality.

We note that the Kemp's Ridley Sea Turtles are the most endangered and most rare sea turtle. The re-licensing of OCNGS will result in the continued killing and harassing of this species.

In 1993, NOAA required a formal consultation on the operation of the OCNGS due to seven (7) takes of threatened and endangered sea turtles over two summers (1992 and 1993). Since then, OCNGS has met or exceeded their Incidental Take Allowance ("ITA") for endangered sea turtles four (4) times. Most notably, OCNGS exceeded their annual incidental take in 2004 when

eight (8) juvenile Kemp's Ridley Sea Turtles (of indeterminate sex) were impinged and three (3) were killed in the three-month period from July 4 to September 23.

Despite this poor performance, in 2005, the National Marine Fisheries Service ("NMFS") inexplicably increased OCNCS's annual take limit of Kemp's Ridleys to eight (8) (with no more than four (4) mortalities). While Section 4.8.1 of the Draft GEIS suggests that OCNCS's Incidental Take Allowance was raised by NOAA due to an increase in Kemp's Ridley population abundances, there is no evidence that this species has rebounded. Kemp's Ridley retains its current status as being the most endangered of all the sea turtles. Rather, it appears that NMFS raised the take limit to accommodate mortalities that occur at the plant, as NMFS acknowledged that the continued operation of the plan may adversely affect this endangered species.

In the latest (2005) Section 7 Consultation, NFMS concluded that "the continued operation of the OCNCS may adversely affect but is not likely to jeopardize the continued existence of endangered Kemp's Ridley, green, or threatened loggerhead sea turtles" *These findings contradict the conclusion (said to be based on the 2005 consultation) in the Draft GEIS that impacts on threatened or endangered sea turtles from continued operation of OCNCS would be SMALL. Based on the information provided by NMFS, it is more appropriate to conclude the operations of OCNCS will at least have a MODERATE impact based upon the NRC's definition of same. (See Draft GEIS at 1-3) (GG-17)*

Comment: Loggerheads (2-51) population estimated at 44,780. The DEIS cites CCC 2005. CCC 2005 states that the population estimate is 44,560 nesting females, and includes the following caveat: "Please understand that world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.ccct~utle.org/loggerhead.htrnaccessed> August 31,2006. Does NRC factor the uncertainty into its conclusions about the populations? (MM-43)

Comment: Kemp's Ridley sea turtle are the world's most endangered sea turtle (2-51). No population numbers exist. However, even while NMFS was concluding its consultation with NRC in 2005, two additional Kemp's Ridleys were at the Facility in July 2005. Why is this information not presented? NRC reinitiated consultation with NMFS in June 2006, but that is not reflected here. Has NRC failed to consider that the Facility continues to take endangered sea turtles? (MM-44)

Comment: With respect to Leatherbacks (2-52), the DEIS cites Pritchard data from 1983 and estimates females at 100,000. This data is over 20 years old. The CCC number is not supported with any data, and contains caveat that "world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.cccturtle.org/leatherback.htm>

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accessed August 31,2006. How can NRC make any conclusions about Leatherbacks without this information? (MM-45)

Comment: With respect to Green sea turtles (2-53), the CCC numbers cited also have the same caveat: "Please understand that world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.cccturtle.org/green.htm> accessed August 31,2006. Again, how can NRC arrive at conclusions about the impacts under these circumstances? (MM-46)

Comment: On page 4-44, NRC essentially concludes that the impacts to species are small, because FWS concluded that the project would not adversely affect federally listed species. Is NRC confusing the jeopardy standard under Section 7 of the ESA with the requirements of NEPA? We know the Facility is adversely affecting species, because it is killing and injuring some of the world's most endangered sea turtles. (MM-62)

Comment: There is no evidence to suggest that anyone knows what the population abundances are for turtles, so one cannot assume that the ITS mitigates any and all impacts. (4-53) The fact of the matter is that this Facility kills turtles, and those turtles are either threatened or endangered species. (MM-68)

Response: *The presentation of the impacts of impingement on sea turtles has been revised in the SEIS to reflect the potential for lethal takes and the lack of conclusive population abundance data. The number of sea turtle takes at OCNCS is not large enough to alter noticeably important attributes of the sea turtle populations; therefore, the adverse effects on the species would be small as defined by regulations to implement the ESA as well as NEPA. The text also presents the compliance requirements of the current BO and describes the handling protocols employed at OCNCS when sea turtles are found in the intake canal or on the trash racks.*

Comment: Endangered species policy inconsistent with other government agencies: Five species of sea turtles that are listed as either threatened or endangered live in the vicinity of OCNCS, at which there have been 34 reported cases on impingement of these turtles with a mortality rate of approximately 50% (NUREG-1437, Supplement 28, p 2-51 – 2-53). The removal of these individuals from the sea turtle populations can have dramatic effects on overall species viability, especially as they are attracted to artificially warmed waters surrounding the reactor and therefore vulnerable to dangers posed by the intake structure. While the supplemental EIS says that there is no significant impact to the species from reactor take limits, extending the permissible killing of protected species through the renewal period goes against the stated objectives of other government agencies and legislation. (EE-13)

Response: *The NRC staff has consulted with NMFS in compliance with Section 7 of the ESA. OCNCS currently operates under incidental take limits established by NMFS in 2005. NMFS*

also issued a BO regarding effects of OCNGS operations during the license renewal period. That BO would replace the existing BO on the date of license issuance if the NRC renews the OCNGS OL. In that BO, NMFS concluded that, continued OCNGS operation “may adversely affect but is not likely to jeopardize the continued existence of loggerhead, Kemp’s ridley or green sea turtles” and that it is not likely to appreciably reduce the likelihood of survival and recovery of loggerhead, green, or Kemp’s ridley sea turtles” On the basis of the above, the NRC staff concludes that the impact of OCNGS operations during the license renewal period would be SMALL for all species of sea turtles. The text of the SEIS has been modified in response to this comment.

Comment: Someone talked about sea turtles. We train our operators to recognize the turtles that are endangered, and they go through some pretty impressive efforts. They're trained to resuscitate turtles. We're talking about turtle CPR. (Z-3)

Response: *The OCNGS handling protocols for sea turtles found in the intake canal or on the trash racks are described in Section 4.6.1 of the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The list of threatened and endangered species appears only to relate to federal species, with mention made of corresponding state listing status. Why are state listed species not considered (2-59)? (MM-47)

Response: *Contrary to the assertion in the comment, the list of species presented in Table 2-5 of the SEIS includes species that are only listed by the State and are not federally protected.*

Comment: With respect to bog asphodel (2-69), the DEIS says it is not likely to occur on the site. But it occurs within 1.3 miles of the site. NRC fails to articulate how the habitat 1.3 miles away from a 800 acre site can be so different that the species is not present on the site. The same comment applies to swamp pink (2-68), Knieskern's Beaked-Rush (2-60), and chaffseed (2-70). (MM-49)

Response: *The descriptions of the bog asphodel, swamp pink, Knieskern's beaked-rush, and chaffseed presented in Section 2.2.6.2 of the SEIS include a listing of the types of habitat suitable for those species. As stated in the text, based on the habitat requirements of the bog asphodel, swamp pink, and Knieskern's beaked-rush, they may occur on isolated areas of the undeveloped portions of the OCNGS site and along the OCNGS-to-Manitou transmission line right-of-way. Botanical surveys have not been performed in the project area for rare plants to confirm the presence of these species. However, impacts on these species would be unlikely as activities during the license renewal period are not expected to impact project area wetlands. All recorded occurrences of the chaffseed in the State are historical rather than recent. The text of the SEIS has been modified in response to this comment.*

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Comment: The site is suitable for bog turtle (2-71). Were impacts to this species considered? If so, what was NRC's conclusion? (MM-50)

Response: *The SEIS states that the northern portion of the OCNGS-to-Manitou transmission line right-of-way (not the OCNGS site) may contain suitable habitat for the bog turtle. However, as stated in Section 4.6.2, the FWS concluded that the bald eagle was the only Federally listed species known to occur within the OCNGS area, and that the proposed license renewal would not adversely affect Federally listed species or critical habitat under FWS jurisdiction. In addition, maintenance activities and operations of the transmission line and right-of-way are not likely to affect the bog turtle. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: In Section 4.6.2. NRC makes a conclusion that terrestrial species impact is small. However, FWS recommended a survey. Why was this survey not completed before the DEIS was prepared and NRC reached its conclusions about impacts? (MM-63)

Response: *Although, during scoping, the FWS recommended a survey, it did not imply nor state that such a survey was a requirement for ESA compliance. Furthermore, the NRC does not have the authority to require such a survey unless required by a FWS-prepared BO. Therefore, the NRC staff based its conclusion on the best information available at the time the SEIS was prepared. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: There is no discussion of the affects on state listed species. (4-53). The NRC should explain how it comes to the conclusion that with respect to threatened or endangered plants, there can be species found within one mile of the site, but yet the site is not suitable for those species. NRC or the applicant must explain how the 800 site differs from the habitat one mile from the site upon which threatened or endangered species are found. The absence of critical habitat does not mean that there is no adverse affect on a species. (MM-69)

Response: *State-listed species are discussed in several portions of the SEIS. State-listed species and their habitats in the general vicinity of the OCNGS site are presented in Section 2.2.6.2. The main OCNGS site is already developed, and, therefore, would likely not contain any suitable habitat for State-listed species. The Finninger Farm portion of the site, where most undisturbed habitat occurs, is unlikely to be affected by continued operations. Impacts related to transmission line right-of-way management are discussed in Section 4.2. While suitable habitat may exist on the Finninger Farm and along the transmission right-of-way, continued operations are not expected to affect any species or their habitats. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.6 Comments Concerning Human Health Issues

Comment: I read some of the comments in the paper that I picked up. A doctor had said that the radiation effect on children in the area, on the children's teeth in the area, was a whole lot higher in the areas around nuclear power plants. So what about that? Have you addressed that? Is that in the purview of licensing or does the idea of radiation in the environment not affect you if you're not living here or in the shadow of another nuclear power plant? (F-4)

Comment: ...in-body levels of radiation. Until our group came along, no one had ever done any sort of a study on how much radiation was in bodies of people who live near nuclear power plants. Okay? We began in 1998 something called the baby tooth study or the tooth fairy study. It is not a new idea. It has been done in the past before. A group of scientists from St. Louis in the '50s and '60s did a study of strontium-90 in baby teeth that resulted from bomb test fallout. There have been studies of strontium-90 after Chernobyl. There's another one of near the Sellafield plant in England. Our study has looked at almost 5,000 teeth. Over 600 are from New Jersey. We have found a couple of alarming things. Near every plant, including Oyster Creek, number one, from the late '80s to the late '90s, the average strontium-90 in baby teeth of local children has increased about 50 percent.

Now, one of the handouts in the back is a fact sheet on the baby tooth study, which says that the study has been discredited. Well, I beg to differ. We have published articles in five different medical journals. That has gotten the peer review stamp of approval from experts, who say the study is worthy of publication. The contention of people who oppose the study is that the strontium-90 that comes out of the reactors that gets into people's body, it's all leftover bomb test fallout from the '50s and '60s. Well, if that were the case, why did we find such a sharp increase near Oyster Creek, near Limerick, near Indian Point, near Millstone, near the reactors in Florida, and so forth? (K-6)

Comment: In the case of Oyster Creek, there is considerable data to suggest that emissions from the plant have entered the environment and human bodies, and are a potential co-factor in local cancer rates.

- In-Body Radioactivity. Since 1998, RPHP has conducted a study of Strontium-90 in baby teeth, the only study of in-body levels near U.S. nuclear plants. The study, which is patterned after a similar study of bomb test fallout by Washington University in the 1960s, has tested nearly 5,000 teeth for concentrations of this isotope. Five peer-reviewed medical journal articles have been published on study findings, giving the study recognition from the scientific community.

In New Jersey, over 600 teeth have been tested, many from Ocean and Monmouth Counties, which are closest to and downwind from Oyster Creek. From 1986-89 to 1994-97, the average picocuries of Sr-90 per gram of calcium in teeth at birth rose nearly 50% in recent years:

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Births from 1986-89 2.51 pCi/g Ca (n=44)

Births from 1994-97 3.76 pCi/g Ca (n=31)

This finding, which duplicates that found near six other U.S. reactors, nullifies the contention of some critics that all Sr-90 in teeth are from bomb tests of the 1950s and the 1960s. Discussion of other sources of Sr-90 and why it is likely that much of the Sr-90 represents ongoing emissions from nuclear plants can be found in Mangano JJ et al. An unexpected rise in strontium-90 in US deciduous teeth in the 1990s. *The Science of the Total Environment* 2003;317:37-51. (SS-5)

Comment: RPHP has examined potential links between Oyster Creek radioactivity and cancer. In our most recent journal article, we found that trends in average Sr-90 in baby teeth Monmouth and Ocean county children were followed by similar trends in cancer incidence rates age 0-9 in the two counties, with a five-year latency. Findings were duplicated near the Brookhaven and Indian Point nuclear facilities in New York. Thus, RPHP has found a statistical link between Sr-90 in local teeth and cancer risk. More work needs to be done, but this evidence should be taken seriously. (Data published in Mangano JJ. "A Short Latency Between Radiation Exposure from Nuclear Plants and Cancer in Young Children." *International Journal of Health Services* 2006;36(1):113-35). (SS-7)

Response: *The NRC has reviewed a number of studies by the Radiation Public Health Project (RPHP) that assert that levels of radioactive strontium-90 are rising in the environment and that these increased levels are responsible for increases in cancers, particularly cancers in children, and infant mortality. The group claims that radioactive effluents from nuclear power plants are directly responsible for the increases in strontium-90. In one study, researchers reported that strontium-90 concentrations in baby teeth are higher in areas around nuclear power plants than in other areas. This has sometimes been referred to as "The Tooth Fairy Project."*

However, as discussed in a background paper prepared by the NRC (2005), numerous peer-reviewed, scientific studies do not substantiate the RPHP claims, and the NRC finds that there is little or no credibility in the RPHP's studies. Approximately 99 percent of strontium-90 in the environment came from atmospheric testing of nuclear weapons. The second largest source of strontium-90 in the environment was the Chernobyl accident. The amount of strontium-90 from all commercial nuclear power plants is a tiny fraction of the amount from Chernobyl. The estimated radiation dose from all sources of strontium-90 in the environment is approximately 0.3 percent of the dose that the average person in the United States receives from natural background radiation. These dose levels are well below the levels that are known to cause any health effects. The NRC requires nuclear power plant licensees to monitor the releases of radioactivity from their facilities to the environment and to annually report these releases to the NRC. Additionally, these licensees are required to monitor the environment around their facilities and report results annually to the NRC. The NRC routinely inspects these aspects of nuclear power plant licensee performance.

In addition, the New Jersey Commission on Radiation Protection and the NJDEP recently reviewed the RPHP study "Understanding Patterns and Trends of Radioactive Sr-90 in Baby Teeth of New Jersey Children with Cancer: A Report to the New Jersey State Department of Health and Senior Services," for which the State of New Jersey had appropriated funding. The Commission on Radiation Protection and the NJDEP reviewed the RPHP findings from a number of perspectives (State of New Jersey 2006), including the reliability of the measurements of strontium-90 in teeth, an assessment of the reported data, the scientific validity of the statistical methods employed, and a bounding calculation of the fate of strontium-90 in the environment from OCNGS. The Commission on Radiation Protection and the NJDEP concluded that further study is not worth pursuing because (1) the scientific validity of the data in the report is questionable, (2) the predominance of environmental data shows no increase of strontium-90 in the environment, (3) conservative modeling demonstrates that the strontium-90 in baby teeth did not originate from OCNGS, and (4) it is highly likely that the strontium-90 seen in baby teeth is from global fallout from nuclear weapons testing.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: ...the radioactive emissions, which are put out, which is okay with the NRC. However, recently the National Academy of Sciences in their BEIR VII, which is an acronym, said that no amount of radiation is acceptable. Any amount is dangerous. And we know that we see around us the incidence of cancer, for instance, is just on the increase. But that is obviously anecdotal. I haven't done a scientific study. Why hasn't the NRC changed its category 1 evaluation? In other words, this is small, a small risk. (D-3)

Comment: The issue of human health -- my colleagues and I believe this report is very, very deficient, even irresponsible, even dangerous. The reason for this is that the NRC makes a very, very large presumption. They presume that as long as emissions of radiation into the environment from Oyster Creek are below permissible limits, therefore, they can presume to be harmless. And there is no need to do any health studies or health analyses and reports such as this. Now, I am a public health researcher. We are trained not to make presumptions like this. This is almost like presuming that if one smokes three cigarettes a day or less, let's say, this is a safe level of cigarette intake and there is no harm involved and no need to do health studies. Well, the more professional way to go about it is to don't make any such presumption, to do the health studies (K-1)

Comment: We have a long history in the atomic age of presumptions of low dose being safe later found out to being the reverse, to being harmful. Years ago, doctors did X-rays, pelvic X-rays, on women who were pregnant. Up until the 1970s, they were found to increase childhood cancer. Discontinued. For many years, the government said that the bomb tests from Nevada did no harm to Americans. In 1997, a Federal study showed that as many as 212,000 Americans suffered thyroid cancer from the tests. For years, the government said that

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workers in nuclear weapons plants were not harmed. In 2000, the government reversed their policy and passed a law, agreeing to compensate cancer victims who worked in nuclear weapons plants. So we must take the same approach here with routine emissions, low dose that they are, with nuclear power plants. (K-2)

Comment: There's an epidemic of autism and cancer, and that has been linked to nuclear emissions. The National Academy of Sciences recently stated that no amount of radiation is safe. (Q-3)

Comment: I mean, this Strontium-90 stuff is simply not a fantasy. It's real. Leukemia, cancer, that's the plague of the 20th Century. You want to make sure that people get a whole bunch of that? (Y-8)

Comment: I and my colleagues find the recent Generic Environmental Impact Statement for Oyster Creek to be deficient in assessing health risk of extending the reactor's license for 20 years. The assumption that environmental releases of radioactivity do not pose a health risk because amounts are below federally permitted levels is presumptive, and does not constitute sound public health policy. Actual/historical effects of environmental releases should be thoroughly studied and the public informed of any potential or actual health risk before the license extension is considered. (SS-1)

Comment: The assumption that low dose radiation exposure was harmless has been contradicted for several types of exposure:

- Pelvic X-rays to pregnant women were performed regularly until studies (starting with Dr. Alice Stewart's work in the 1950s) showed that such exposures raised risk of cancer to the fetus during childhood.
- A 1997 National Cancer Institute study estimating as many as 212,000 Americans developed thyroid cancer from exposure to radioactive iodine was the first admission by the federal government that bomb tests had harmed Americans.
- In a 2000 report, the U.S. Energy Department made its first admission that occupational exposures to nuclear weapons facility workers resulted in elevated cancer risk. (SS-2)

Comment: I and my colleagues urge the NRC to thoroughly examine potential health risks from Oyster Creek using available data - rather than just presuming that permissible doses are safe - before making a decision on the 20 year license extension for Oyster Creek. (SS-8)

Response: *The comments are noted. Radiation exposure to the public during the license renewal term is a Category 1 issue that was evaluated in the GEIS.*

Health effects from exposure to radiation are dose-dependent, ranging from no effect at all to death. Above certain doses, radiation can be responsible for inducing diseases such as cancer. Very high (hundreds of times higher than a rem), short-term doses of radiation have been known to cause prompt (or early, also called “acute”) effects, such as vomiting and diarrhea, skin burns, cataracts, and even death.

Although radiation may cause cancers at high doses and high dose rates, currently there are no data that unequivocally establish the occurrence of cancer following exposure to low doses and dose rates, below about 0.1 Sv (10 rem). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and detriments such as cancer induction. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public, as found in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I.

In spring 2006, the National Research Council of the National Academies published Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII Phase 2. The major conclusion of the report is that current scientific evidence is consistent with the hypothesis that there is a linear, no threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC’s regulations continue to be adequately protective of public health and safety and the environment. None of the findings in the Biological Effects of Ionizing Radiation (BEIR) VII report warrant changes to the NRC regulations.

Moreover, the BEIR VII report does not say that there is no safe level of exposure to radiation; it does not address “safe versus not safe.” It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that the risk increases with exposure and exposure rate. It does conclude that the risk of cancer induction at the dose levels in the NRC’s and EPA’s radiation standards is very small. Similar conclusions have been made in all of the associated BEIR reports since 1972 (BEIR I, III, and V); the BEIR VII report does not constitute new and significant information. In addition, these reports did not establish a link between radiation exposure and autism.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

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Comment: You can't in my opinion and my colleagues' opinion recommend that a reactor operate for another 20 years without doing a good report card of what the health status and health changes have been in the local area in the first 37 years this plant has been running. The statistics, we certainly haven't done a comprehensive review, but we have certainly gone through childhood cancer statistics. And they're quite poor.

Ocean and Monmouth Counties for years have been much higher than state or national, about 25 percent higher. The cancer death rate among children in these 2 counties is something like 43 percent higher in the last decade. You all well know that in about a decade ago, there was a large, the revelation of a large, outbreak of childhood cancer in Toms River, which is right here and close to Oyster Creek. Now, the State Health Department looked for something like 6 years and spent \$10 million, found no environmental connections, but this shouldn't end it. When we have this many great concerns here, we should not be giving carte blanche or this reactor to operate another 20 years. (K-7)

Comment: In the case of Oyster Creek, there is considerable data to suggest that emissions from the plant have entered the environment and human bodies, and are a potential co-factor in local cancer rates.

- Local Cancer Rates. Infants and children are especially susceptible to the harmful effects of radiation. In 2003, the U.S. Environmental Protection Agency published a report estimating that exposures to persons under age two are 10 times as harmful as similar exposures to adults.

According to the New Jersey cancer registry, Ocean and Monmouth Counties have a rate of cancer diagnosed in children under age ten in 1981-2000 that is 24% higher than the U.S. rate (significant at $p < .001$). A total of 523 local children were diagnosed over the two decades. U.S. data is from the SEER data base of nine U.S. states and cities.

	<u>Cases 0-9</u>	<u>Pop. 0-9</u>	<u>Cases/100,000</u>
Monmouth/Ocean	523	2,720,723	19.22
U.S.			15.50

In addition, the rate of cancer deaths among Monmouth and Ocean County children age 0-9 has steadily risen in the past two decades, while state and national rates have fallen. Data are from the National Center for Health Statistics, available at <http://wonder.cdc.gov>, underlying cause of death.

5 Year Period	Deaths 0-9	Avg.Pop 0-9	Deaths/100,000
1980-84	21	114,346	3.67
1985-89	26	126,415	4.11
1990-94	29	141,374	4.10
1995-99	34	153,988	4.42

Change 1980-84 to 1995-99

Monmouth,Ocean counties	+20.2%
New Jersey	- 22.9%
U.S.	- 35.4% (SS-6)

Response: *The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low that resulting cancers have not been observed and would not be expected. A number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted and there are no studies to date that are accepted by the scientific community that show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. A number of studies that have been conducted and accepted by the scientific community are described below.*

In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded that there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby.

In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island power plant and cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 mi of the plant at the time of the accident.

In January 2001, the Connecticut Academy of Sciences and Engineering issued a report on a study around the Haddam Neck nuclear power plant in Connecticut and concluded that radiation emissions were so low as to be negligible.

The American Cancer Society in 2001 concluded that although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more

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often near nuclear plants than they do by chance elsewhere in the population. Likewise, there is no evidence that links strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates. Radiation emissions from nuclear power plants are closely controlled and involve negligible levels of exposure for nearby communities.

Also in 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. However, using the same data to reconstruct the calculations on which the claims were based, Florida officials were not able to identify unusually high rates of cancers in these counties compared with the rest of the State of Florida and the nation.

In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically significant difference.

With respect to Ocean County, increased incidence of leukemia and brain and nervous systems cancers have been reported in children. Consequently, in 2003 the New Jersey Department of Health and Senior Services (NJDHSS) and the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a comprehensive study and released the report Case-control Study of Childhood Cancers in Dover Township (Ocean County), New Jersey, which provided a study of possible risk factors for childhood cancers in Dover Township (NJDHSS and ATSDR 2003). The study specifically included OCNGS as a site of community concern. One of the conclusions of the case-control study was that OCNGS emissions did not appear to be associated with any childhood cancer groupings in the study area. The NJDHSS plans to continue its surveillance of childhood cancers in Dover Township, and will report statistical analyses when an additional 5 years of data are available (2001 – 2005) (NJDHSS 2004).

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: I work in cancer research, and I develop drugs to fight cancer, and I would have the slightest idea that the plant or radiation would be the cause for any increase in leukemia or whatever, I wouldn't have come here. There is absolutely no evidence from the New Jersey Cancer Commission that there is an increase in rates in this area due to the plant. So I think you really have to look at the information and the data that is present. The same about autism. I think a lot of hearsay is published and then read, and I think health concerns if they are not extinguishing our animal populations that are in the water that comes out of the plant, they're much less affecting us. (U-1)

Response: *The comment is noted. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: A good environmental impact statement I believe should contain information on at least four items: the amount of emissions, the amount of radioactivity in the environment, the amount of radioactivity in bodies of people living near nuclear plants, and cancer rates in the local area. Our group has done considerable work on this near Oyster Creek and near other nuclear plants. (K-3)

Comment: As far as the first one, emissions, go, Oyster Creek, of the 103 reactors now operating in the United States, Oyster Creek has emitted the greatest amount of airborne radioactivity, of any of the reactors, something around 77 curies, what we call iodine-131 and particulates, anything with, you know, a half-life of 8 days or more, and 5 times as much as was officially released at Three Mile Island. Okay.

Even individual chemicals, such as strontium-90, strontium-89, iodine-131, barium-140, Oyster Creek consistently ranks in the top five reactors in the United States. You can go right on the NRC Web site and find out the data for the last couple of years. (K-4)

Comment: Number two, environmental radioactivity. If you go to the Web site that's run by the EPA, they have extensive data on levels of radioactivity in the environment, in the air and the water and the soil and so forth. Water-borne radioactivity in Waretown, which is just one mile from the plant, is between 2 times and 10 times as high as that at Trenton, for example, which is 50 miles from here. (K-5)

Comment: I'm concerned about low-level radiation. The NRC just reported before in response to my question about the Environmental Impact Statement about what that showed in the release of emissions from Oyster Creek, and the answer is that it was something like zero, zero, zero, zero, zero, nine, four-tenths or four-whatever, and I suspect I am very suspect about that data, and I believe there's a possibility that the data might be flawed. About three years ago Oyster Creek had emitted the highest amount of radioactivity, including Strontium 90, among all the nuclear plants. What happened between three years ago and last year? (Q-1)

Comment: Routine releases: The supplemental EIS does not discuss the substantially above average routine releases of radioactivity into the environment from OCNGS. For airborne emissions of Barium-140, Iodine-131, Strontium-90 and Strontium-89, OCNGS was in the top ten ranked reactors in 2003. OCNGS ranked number one for Strontium-90, which carries a half-life of 29 years, during 2003. The cumulative effects of these low-doses of radiation should be discussed in the EIS, as the National Academy of Sciences has found that there is no safe dose of radiation (NAS BIER IIV, 2005). (EE-8)

Comment: The plant's radioactive gas waste emissions that are dumped into our air and surrounding waters are a danger. Many local officials have gone on record as saying they also are opposed. Please consider the consequences of your actions for the future of the

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communities surrounding this area and the children who will be exposed years from now.
(NN-2)

Comment: In the case of Oyster Creek, there is considerable data to suggest that emissions from the plant have entered the environment and human bodies, and are a potential co-factor in local cancer rates.

Emissions. Oyster Creek has historically released much higher levels of environmental radioactivity compared to other U.S. nuclear reactors. From 1970 to 1993, it emitted a total of 77 curies of Iodine-131 and particulates into the air, the highest of any U.S. reactor. (Data from Radioactive Materials Released from Nuclear Power Plants, annual report 1993. NUREG/CR-2907).

In 2003, the last year for which data is available, Oyster Creek ranked high among U.S. reactors for the following isotopes (data are taken from the NRC Radiation Exposure Information and Reporting System on effluents, available at: www.reirs.com/effluent/EDB_rptLicenseeReleaseAmtsQuery.asp, and expressed in total microcuries:

Strontium-90	62.3	1 st highest
Strontium-89	6233	2 nd highest
Barium-140	8672	2 nd highest
Iodine-131	10,770	9 th highest
Krypton-85m	21,100,000	4 th highest
Krypton-87	81,900,000	2 nd highest (SS-3)

Comment: In the case of Oyster Creek, there is considerable data to suggest that emissions from the plant have entered the environment and human bodies, and are a potential co-factor in local cancer rates.

Environmental Radioactivity. Levels of environmental radioactivity near Oyster Creek are much higher than in areas far from nuclear plants (i.e., Waretown, one mile from the plant, vs. Trenton, 50 miles distant). The information is taken from annual measurements in drinking water from 1984-2003 from the U.S. Environmental Protection Agency program known as Environmental Radiation Ambient Monitoring System (<http://oaspub.epa.gov/enviro/erams>), and expressed in average picocuries per liter.

Strontium-90	Waretown .0553	Trenton .0264
Gross Alpha	Waretown .925	Trenton .088
Gross Beta	Waretown 2.015	Trenton 1.523

Thus, gross alpha levels are more than ten times higher in Waretown, Strontium-90 is more than two times higher, and gross beta is 32% higher. (SS-4)

Response: *All nuclear plants were licensed with the expectation that they would release radioisotopes to both the air and water during normal operation. Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I. Regulatory limits are placed on the radiation dose that members of the public might receive from all of the radionuclides released by the nuclear plant combined. Among other requirements, the regulations specify that the dose to individual members of the public from radioactive effluent releases from nuclear fuel cycle facilities be less than 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ (40 CFR Part 190). In addition, the total dose to a member of the public is limited to 100 mrem per year from all sources (10 CFR Part 20). In 10 CFR Part 50, dose objectives are specified for both air and liquid effluents.*

Licensees are required to report liquid, gaseous, and solid effluent releases annually to the NRC. As part of the preparation of the draft SEIS, the NRC staff visited the site and reviewed the effluent releases reported in the OCNGS Annual Radioactive Effluent Release Reports for the years 2000 through 2004. Average gaseous emissions from OCNGS are discussed in Section 2.1.4.2 of the SEIS. Although OCNGS had, during the early years of operation, among the highest airborne emissions of radionuclides among U.S. nuclear power plants, the releases and radiation doses to members of the public from all airborne radioactive emissions from OCNGS were and are well within the regulatory limits specified above.

As discussed in Section 2.2.7 of the draft SEIS, annual emissions from OCNGS result in a dose to the maximally exposed individual (MEI) that is much less than 1 mrem and much less than 1 percent of the regulatory limits. Health effects due to radiation exposure at this level are highly unlikely and would be indistinguishable from effects due to background radiation. The average dose from all sources of radiation, including the natural background, is approximately 360 mrem per year. With respect to the BEIR VII report, the report does not say that there is no safe level of exposure to radiation; it does not address "safe versus not safe." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that the risk increases with exposure and exposure rate. It does conclude that the risk of cancer induction at the dose levels in the NRC's and EPA's radiation standards is very small.

In addition, as discussed above, in 2003 the NJDHSS and the ATSDR conducted a comprehensive study of childhood cancers in Dover Township (Ocean County) (NJDHSS and ATSDR 2003) and concluded that OCNGS emissions did not appear to be associated with any childhood cancer groupings in the study area.

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With respect to drinking water, most drinking water sources have low levels of radioactive contaminants, the majority of which are naturally occurring. Concentrations of radionuclides in drinking water vary considerably between municipalities and across geographic regions and depend on source water characteristics (such as groundwater versus surface water) as well as on the drinking water treatment system employed. According to the NJDEP, sampling of public and private wells that draw water from southern New Jersey's Cohansey aquifer has shown elevated levels of naturally occurring radioactivity (NJDEP 2006c). The aquifer, sometimes referred to as the Kirkwood-Cohansey aquifer, is present in all, or parts of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean, and Salem Counties. It is not unusual to observe the differences in concentrations reported for Waretown, New Jersey, and Trenton, New Jersey, given the natural variability of radionuclides in drinking water sources. In both cases, the concentrations provided by the commenter are considerably below the EPA drinking water standards for radionuclides. There is no evidence to suggest that the differences noted between Waretown and Trenton are related to OCNGS operations. A REMP conducted around the OCNGS site since 1966 has not shown radioactivity attributable to OCNGS in surface water or groundwater in the vicinity of the site.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: I have attached a chart that was provided to me by a resident of Ocean County. The chart notes that Oyster Creek had the second highest emission of Strontium-90 of twenty nuclear plants surveyed, from 2001 to 2003. The source listed is the NRC, but the web page listed at the bottom of the chart is not accessible. Please comment on this information, as it appears to be inconsistent with information contained within the draft Environmental Impact Statement for Oyster Creek. (VV-1)

Response: *Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I. Release limits are not specified for individual radionuclides, such as Sr-90. Rather, regulatory limits are placed on the radiation dose that members of the public might receive from all of the radionuclides released by the nuclear plant combined.*

Among other requirements, the regulations specify that the dose to individual members of the public from radioactive effluent releases from nuclear fuel cycle facilities be less than 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ (40 CFR Part 190). In addition, the total dose to a member of the public is limited to 100 mrem per year from all sources (10 CFR Part 20). In 10 CFR Part 50, the NRC requires that nuclear plant operators must keep radiation doses from airborne and liquid effluents as low as reasonably achievable (ALARA) to people offsite, and dose objectives are specified for both air and liquid effluents.

Although OCNGS had the second highest emissions of Sr-90 among the 20 reactors listed in the document provided by the commentor, the radiation dose to members of the public from all airborne radioactive emissions from OCNGS are well within the regulatory limits specified above. As discussed in Section 2.2.7 of the Draft SEIS, emissions from OCNGS result in doses that are much less than 1% of the regulatory limits. Consequently, the comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: Are there monitors at the top of the stack? Are there records for telling us what is coming out? I think that would be useful for the average citizen and it be important for the NRC to consider that as positive proof of what they're doing or where the plant is going. (B-3)

Comment: Number two, much of the data is obtained by the stacks. The stacks is monitored by Oyster Creek. In Illinois, the nuclear plants are monitored by independent sources and for good reason, because it's easy to change the data. (Q-2)

Comment: The nuclear plant sits on the Cohansee Aquifer, which supplies us with our drinking water, and in light of the fact that Toms River has some radiation in their wells, I wondered if the NRC considered the fact that the nuclear plant could potentially be polluting with radiation, invisible radiation our drinking water. And of course, that is of major concern. (BB-1)

Comment: How is it that the nuclear plant can sit on the Cohansee Aquifer which gives us our drinking water? And I don't know if you can address that this evening, but certainly in your impact statement I would like to see that being addressed because I think that's a major, major point that was not brought up. I don't know. I haven't been to all of the meetings, but I think it's very crucial because obviously we as human being -- we're human beings before we're workers or before we're anything, and we need clean water that doesn't have radiation. (BB-3)

Comment: The health and safety of the ecologically delicate Cohansey and Kirkland aquifers for present and future generations demand that a more viable and in-depth study of the extent of the "intrusion" of radionuclides into these aquifers be undertaken and documented as a part of this report and for the public record. (YY-7)

Response: *As described in Section 2.1.4.2 of the SEIS, gaseous releases at OCNGS may occur from the 368-ft above-grade plant stack and vents on the turbine and off-gas buildings. Each release point is equipped with radiation monitoring equipment, including radioactive noble gas monitors, iodine samplers, and particulate samplers, as well as effluent flow and sample flow measuring devices. These systems must be maintained and routinely checked in accordance with OCNGS technical specifications.*

Each year, results of measurements of radiological releases and environmental monitoring are summarized in two annual reports: the OCNGS Annual Radiological Environmental Operating

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Report and the OCNGS Radioactive Effluent Release Report. The limits for all radiological releases are specified in the Offsite Dose Calculation Manual, and these limits are designed to meet Federal standards and requirements. As part of the preparation of the draft SEIS, the NRC staff visited the site and reviewed the annual effluent and environmental reports for OCNGS.

With respect to potential contamination of the Cohansey Aquifer, a REMP has been conducted around the OCNGS site since 1966. Through this program, radiological impacts on the environment are monitored, documented, and compared with the appropriate standards. The REMP includes monitoring of the concentrations of beta and gamma emitters, iodine, and strontium in the air; concentrations of gamma emitters in surface water, well water, fish, clams, sediment, and vegetation; concentrations of tritium in surface and well water; and direct radiation (gamma dose on thermoluminescent dosimeter locations). For trending purposes, radiological and direct radiation measurements are compared with past years. Surface and well water samples are analyzed for concentrations of tritium and gamma-emitting nuclides. No fission, activation products, or tritium have been detected in surface water or well water. The REMP will continue throughout OCNGS operations.

As described in Section 2.2.7 of the SEIS, in addition to the REMP conducted by AmerGen, the New Jersey Bureau of Nuclear Engineering, within the NJDEP, operates and maintains an ESMP for the four nuclear power-generating stations in New Jersey, one of which is OCNGS. The purpose of the ESMP is to monitor the various pathways by which people and the environment could be exposed to radiation. Data are collected not only beyond the owner-controlled area, but at various locations onsite. Groundwater sampling is conducted within the OCNGS site boundary. Tap water is sampled from the OCNGS site administration building. Direction radiation measurements using thermoluminescent dosimeters are taken at various locations within the OCNGS site boundary, including the independent spent fuel storage facility. In addition, a Continuous Radiological Environmental Surveillance Telemetry (CREST) system is in place that consists of three pressurized ion chamber devices that measure direct radiation at various locations within the OCNGS site boundary, including the independent spent fuel storage facility. Historically, the results of the ESMP are consistent with those collected by the AmerGen REMP.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: Plant and the Environment, Radiological Impacts (Page 2-75). Following is a clarification of the Department's Environmental Sampling and Monitoring Program (ESMP). Data are collected not only beyond the owner controlled area, but at various locations onsite:

Groundwater sampling is done within the OCNGS site boundary. Tap water is sampled from the OCNGS site Administration Building

Direction radiation measurements using Thermoluminescent Dosimeters are taken at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage facility.

Continuous Radiological Environmental Surveillance Telemetry – Three portable ion chamber devices (CREST monitors) measure direct radiation at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage Facility. (PP-2)

Comment: Following is a clarification of the Department's Environmental Sampling and Monitoring Program (ESMP). Data are collected not only beyond the owner controlled area, but at various locations onsite:

Groundwater sampling is done within the OCNGS site boundary. Tap water is sampled from the OCNGS site Administration Building

Direction radiation measurements using Thermoluminescent Dosimeters are taken at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage facility.

Continuous Radiological Environmental Surveillance Telemetry – Three *pressurized* ion chamber devices (CREST monitors) measure direct radiation at the Independent Spent Fuel Storage Facility. (QQ-10)

Response: *The description of the NJDEP's ESMP in Section 2.2.7 of the SEIS has been modified as suggested by the comments.*

Comment: Plant and the Environment, Gaseous waste processing systems and effluent controls (Pages 2-11 to 2-12). The GEIS states that "continuous radiation monitoring is provided at various points in the system" and that "all gaseous effluents are within the NRC regulatory limits". There is no discussion of the operability/inoperability of the augmented offgas system (AOG) which over the past few years has not functioned at 100% at all times. Operating the AOG at or near 100% will provide the public with confidence that any offsite releases are kept as low as reasonably achievable and well below NRC regulatory limits. It is therefore important that AmerGen commit to high reliability of the AOG at or above 90%. (PP-1)

Response: *Oyster Creek is required by regulation (10 CFR Part 20, 10 CFR 50.34a, and 10 CFR 50.36a) to have radioactive waste systems, Technical Specifications (TSs), and operating procedures to ensure that the doses to members of the public from radioactive effluents meet the as low as reasonably achievable (ALARA) design objectives contained in Appendix I to 10 CFR Part 50. In particular, there is a TS which specifically addresses the operability and use of liquid and gaseous effluent treatment systems. The TS states, "Limitations on the operability and use of the liquid and gaseous treatment systems to ensure*

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that the appropriate portions of these systems are used to reduce releases of radioactivity when the projected doses in a 31-day period would exceed 2 percent of the guidelines for the annual dose or dose commitment conforming to Appendix I to 10 CFR Part 50.”

Thus, Oyster Creek is required to have and to use its radioactive waste systems to maintain its radioactive effluents ALARA. The NRC’s regulations and guidance allow flexibility in the manner in which a licensee meets its obligations to maintain effluents ALARA. From a regulatory perspective, Oyster Creek through the use of its radioactive waste treatment systems is complying with NRC regulations, its TS, and operating procedures while maintaining its radioactive effluents ALARA in accordance with the dose objectives in Appendix I to 10 CFR Part 50. Based on the above, we do not believe that there is a need for AmerGen to commit to maintain a high reliability of the augmented off-gas system at or above 90 percent.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31). During normal plant operations, a certain portion of effluent from the discharge canal is recirculated back through the intake canal. This recirculation may potentially contain radioactive material from the OCNGS that can settle in the aquatic sediment in the intake canal and Forked River. Was sampling of aquatic sediment in the intake canal performed to assess any potential impacts? (PP-7)

Response: *OCNGS has not routinely released liquid radioactive wastes to the discharge canal since the late 1980s and has had no plans to so. Contamination in the discharge canal due to OCNGS operation is almost entirely confined to the bottom sediments. Therefore, any contamination from the discharge canal to the intake canal would be associated with sediment contaminated prior to the late 1980s that is transported from the discharge canal to the intake. As part of the REMP, sediment sampling is conducted semiannually at four locations. Three of the locations are located downstream and could be affected by OCNGS operations. These three locations include (1) Station 33, located 0.4 mi from OCNGS in the discharge canal at the U.S. Highway 9 bridge, (2) Station 24, located 2.1 mi east of the OCNGS in Barnegat Bay near the outflow of the discharge canal, and (3) Station 23, located 3.6 mi east-northeast of OCNGS in Barnegat Bay. The sediment sampling results at these three locations show cesium-137 concentrations ranging up to 39 pCi/kg (Station 24). No other OCNGS activation or fission products have been detected during sediment sampling since the mid-1990s. Sediment sampling is not routinely conducted in the intake canal.*

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: The following questions regards the radiological impacts from OCNGS gasous and liquid releases harmful to people and marine life. McLaren/Hart (2000) documents cobalt 60 and Cesium 137 releases in several locations, some of which was excavated,

1. Why some, not all removed? Is it possible?
2. Why wasn't it discovered earlier (especially if it was released before 1989)? Cesium 137 has a half life of 35 years and is harmful to the ovaries. Cobalt 60, a half life of 5 years and is harmful to the liver.
3. Will there be a followup study?
4. Was there or will there be an NRC investigation of the bioaccumulation of Cs 137 and Cobalt in marine life in Barnegat Bay and Oyster Creek as well as our wells?
5. In this assessment radionuclides were documented in groundwater and soil sediments. What is considered background levels? (JJ-1)

Comment: OCNGS claims to have stopped releasing radionuclides and low level isotopes and radioactive waste discharges during the 80's. The DEP found no compliance issues or toxicity. However, McLaren/Hart 2000 documents Cs 137 and Cobalt 60 releases. (JJ-2)

Comment: The DEIS states that the Facility has not routinely released liquid wastes since 1980s. (2-10). However, the release of these wastes is still potentially part of operations and should be considered in the course of ascertaining impacts to the environment. (MM-15)

Comment: Because tritium was released in 2000 (2-1 I), NRC cannot assume that plant operates without releases of this nature as a possibility. Did NRC factor future releases into its analysis? (MM-16)

Comment: Does NRC take the position that simply because gaseous releases are covered by a permit, that there is no impact? (2-12) (MM-17)

Response: *The McLaren/Hart report (2000) describes the existing conditions of radionuclide concentrations in soil at the site as of February 2000. As discussed in Sections 2.2.3 of the SEIS, this study was conducted as part of the New Jersey ISRA investigation performed from 1998 to 2000 in support of the sale of OCNGS to AmerGen. Soil contamination in limited areas of the site is the result of historical spills or leaks from pipes and tanks containing contaminated water. Depending on the extent, nature, and location of the spills, some of these areas have been excavated and the soil removed. The McLaren/Hart report states that radionuclide activity in the soils at the Oyster Creek plant is not impacting the offsite environment.*

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Limited areas of onsite soil contamination have been left in place for the following reasons: (1) a very limited extent of radionuclides is actually in the soil, (2) the concentrations are decreasing over time due to radioactive decay, (3) groundwater is not being impacted, and (4) access to the area is controlled and limited. In addition, the McLaren/Hart report notes that in many cases far greater radiation doses would be accumulated by the plant workers if they were to remove the soils, as a consequence of being within proximity to contained radiation sources nearby. This exposure far exceeds the resulting dose that could be avoided by the removal of the soil. Consequently, delaying the cleanup of these areas until the plant is decommissioned has the benefit of reducing overall worker radiation doses, while still not impacting offsite areas.

As stated above, the McLaren/Hart report describes the existing conditions of radionuclide concentrations in soil at the site as of February 2000 and was based on existing and well-documented information. The report summarizes historical spills, releases, and soil sampling results as far back as 1981 and did not identify previously unknown areas of contamination. In general, soil sampling was conducted soon after spills or releases were identified. Therefore, findings in the McLaren/Hart report did not represent any new discoveries; the report merely summarizes known and recorded historical conditions.

All nuclear plants were licensed with the expectation that they would release radioisotopes to both the air and water during normal operation. Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I. The regulatory limits were developed to ensure that radiation doses to members of the public from all of the radionuclides released by the nuclear plant combined remain below levels of concern. The releases were, and are, controlled releases so that the amount of radioactive material released to the environment during normal operations is precisely known. The fate of the released materials in the environment is known based on the results of many studies. The movement of these materials through the environment is predicted by models that have gone through extensive field verification.

OCNGS has not routinely released liquid radioactive wastes since the late 1980s and has no plans to resume doing so. However, any potential future releases would be required to meet NRC regulations, and as such, would not be expected to result in significant impacts to members of the public or the environment. Radiation exposure to the public during the license renewal term is a Category 1 issue that was evaluated in the GEIS, which included consideration of gaseous and liquid emissions from nuclear power plants that are within regulatory limits.

Additionally, AmerGen is required to sample various trophic levels in the environment. As stated in Section 2.2.7 of the SEIS, AmerGen has conducted a REMP around the OCNGS site since 1966, with the results presented annually in the OCNGS Annual Radiological Environmental Operating Report. Elevated levels of radioactive contamination above what is

expected in marine life in Barnegat Bay and Oyster Creek because of the operation of Oyster Creek have not been found in recent years.

Furthermore, the licensee's program to substantially reduce routine liquid releases to the discharge in recent years will reduce contamination of aquatic organisms. There is no evidence that indicates that elevated levels of radioactive contamination from nearby groundwater wells are in any way related to Oyster Creek. Wells with elevated levels of radioactive contamination in the Toms River area have been shown to be the result of naturally occurring radioisotopes.

The site REMP includes monitoring of the concentrations of beta and gamma emitters, iodine, and strontium in the air; concentrations of gamma emitters in surface water, well water, fish, clams, sediment, and vegetation; concentrations of tritium in surface and well water; and direct radiation. Sampling locations are chosen based on meteorological factors, preoperational planning, and results of land-use surveys. To establish a baseline to distinguish between background and plant releases, a number of locations, in areas very unlikely to be affected by plant operations – such as upwind, up river, and upgradient – are selected as control points. The sampling results for these control locations are considered to be background levels. These levels vary, depending on environmental media as well as radionuclide.

The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: Why does NRC only consider the monitoring results from 2000-2004 (2-74)? In light of the fact that there have been past releases by the Facility, how can NRC justify reviewing only 4 years of data from a facility that has been in operation for 40 years for purposes of determining whether another 20 years is warranted? In addition to pre-2000 data, post-2004 data should also have been considered. (MM-51)

Response: *The performance of operating reactors is continually monitored by the NRC to ensure conformance with all applicable regulations. Licensees are required to report liquid, gaseous, and solid effluent releases annually to the NRC, and OCNCS has done so over its operational history. In general, radiological releases to the environment from operating reactors have decreased over time. For the purposes of illustrating the magnitude of routine releases to the air and water from OCNCS during the license renewal term, the last 5 years of available data (for the years 2000 through 2004) were summarized in the SEIS. Radiation exposure to the public from routine operations during the license renewal term is a Category 1 issue that was evaluated in the GEIS. The NRC staff has not identified any new and significant information during its independent review of the AmerGen ER, the site visit, the scoping process, or the evaluation of other available information. Therefore, the NRC staff concludes that there would be no impacts of radiation exposures to the public during the renewal term beyond those discussed in the GEIS.*

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The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: With respect to Cesium-137, its presence is attributed to historical releases, and it has been consistently detected. In addition, it has been observed in the teeth of children who live close to the plant. Isn't it likely that it will continue to be detected? Isn't it possible that during the license renewal period, other releases could occur? Why is that possibility not considered? (MM-52)

Response: *All nuclear plants were licensed with the expectation that they would release radioisotopes to both the air and water during normal operation, including cesium-137. Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I. The regulatory limits were developed to ensure that radiation doses to members of the public from all of the radionuclides released by the nuclear plant combined remain below levels of concern. The releases were, and are, controlled releases so that the amount of radioactive material released to the environment during normal operations is precisely known. The fate of the released materials in the environment is known based on the results of many studies. The movement of these materials through the environment is predicted by models that have gone through extensive field verification. The routine release of radionuclides within regulatory limits is expected during the renewal term and was considered during preparation of the SEIS.*

The presence of cesium-137 in sediment samples in the vicinity of OCNGS has been attributed to historical releases of waterborne radionuclides to the discharge canal. OCNGS has not routinely released liquid radioactive wastes since the late 1980s. Cesium-137 is also present in the environment from atmospheric testing of nuclear weapons in the 1960s. Because cesium-137 has a 30-year half-life, it will continue to be detected in the environment for quite some time.

With respect to cesium-137 in children's teeth, it is likely that the commenter is referring to studies conducted by the RPHP that assert that levels of radioactive strontium-90 are rising in the environment and that these increased levels are responsible for increases in cancers, particularly cancers in children, and infant mortality. The group claims that radioactive effluents from nuclear power plants are directly responsible for the increases in strontium-90. In one study, researchers reported that strontium-90 concentrations in baby teeth are higher in areas around nuclear power plants than in other areas. This has sometimes been referred to as "The Tooth Fairy Project." However, as discussed in more detail in the response to Comment SS-7, numerous peer-reviewed, scientific studies do not substantiate the RPHP claims, and the NRC finds that there is little or no credibility in the RPHP's studies.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Can you refer me to data and specific information? You said that "the amount of radioactive material released to the environment during normal operations is precisely known." What levels of radionuclides are considered background as opposed to elevated levels? Can it be answered in microcuries and rads instead of rem ? This applies to Sr 90, Cs 137 and Oyster Creek has emitted the greatest amount of airborne radioactivity, of any reactor in the U.S. The amount is about 77 curies of iodine-131 and iodine and particulates with a half life of 8 days or more. However you testified that OCNGS radiological emissions were a tenth of the amount allowed or 0.026 millirems. How do the two data compare? What about the conclusions? Is it possible that short lasting isotopes are not counted? Do you believe that because an isotope decays rapidly it vanishes harmlessly? Do you know what short lived isotopes become transformed into different radioactive elements as they decay? What does the NRC consider a safe level? Do you disagree with the National Academy of Sciences June 2005 BEIR VII report that concludes all doses of radiation are harmful? If it is calculated that 12 deaths would occur among residents or workers from emissions is it worth the risk? (KK-1)

Response: *All nuclear plants were licensed with the expectation that they would release radioisotopes to both the air and water during normal operation. Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and 10 CFR Part 50, Appendix I. Licensees are required to measure and report liquid, gaseous, and solid effluent releases (including radioactivity) annually to the NRC. For OCNGS, a report titled Annual Radioactive Effluent Release Report, Oyster Creek Nuclear Generating Station is submitted to the NRC each year and available through the NRC Agencywide Documents Access and Management System (ADAMS) website (<http://www.nrc.gov/reading-rm/adams.html>). In addition, the NRC compiles the effluent release data and dose assessment data submitted by licensees in a Radiation Exposure Information and Reporting System (REIRS) database available at http://www.reirs.com/effluent/EDB_Main.asp?l=n.*

With respect to gaseous and liquid effluents discharged by the plant, any measured radioactivity from fission and activation products (such as cesium-137 and strontium-90) in these waste streams are considered to be above background and a result of plant operations. Average gaseous emissions from OCNGS are presented in Section 2.1.4.2 of the SEIS in units of curies (Ci), with dose estimates presented in units of either rad or rem.

Although OCNGS had, during the early years of operation, among the highest airborne emissions of radionuclides among U.S. nuclear power plants, the releases and radiation doses to members of the public from all airborne radioactive emissions from OCNGS are well within the regulatory limits. As discussed in Section 2.2.7 of the SEIS, annual emissions from OCNGS result in a dose to the MEI that is much less than 1 mrem, and much less than 1 percent of the regulatory limits. The methods used to model the fate and transport of the released radioactivity and estimate potential doses to members of the public take into account short and long-lived radionuclides. The radioactive decay of radionuclides is a well-understood physical process,

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and the dosimetric models used take into account the decay products of each radionuclide as it transforms to a stable element. Health effects due to radiation exposure at this level are highly unlikely and would be indistinguishable from effects due to background radiation. The average dose from all sources of radiation, including the natural background, is approximately 360 mrem per year.

In spring 2006, the National Research Council of the National Academies published Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII Phase 2. The major conclusion of the report is that current scientific evidence is consistent with the hypothesis that there is a linear, no threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment. None of the findings in the BEIR VII report warrant changes to the NRC regulations.

Moreover, the BEIR VII report does not say that there is no safe level of exposure to radiation; it does not address "safe versus not safe." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that the risk increases with exposure and exposure rate. It does conclude that the risk of cancer induction at the dose levels in the NRC's and EPA's radiation standards is very small. Similar conclusions have been made in all of the associated BEIR reports since 1972 (BEIR I, III, and V); the BEIR VII report does not constitute new and significant information.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: You stated that "concentrations are decreasing over time due to radioactive decay" as a reason for not removing all of the isotopes. However, were tests then for long lived fission products including plutonium-239, (half life of 24,000 years), radium-226 (half life of 1,600 years) uranium-233 (half life 162,000 years)? (KK-4)

Response: *The McLaren/Hart (2000) report states that limited areas of onsite soil contamination have been left in place for a number of reasons, including (1) a very limited extent of radionuclides is actually in the soil, (2) the concentrations are decreasing over time due to radioactive decay, (3) groundwater is not being impacted, and (4) access to the area is controlled and limited. The report also discusses how radiological monitoring at OCNCS typically focuses on certain target radionuclides, particularly cesium-137, cobalt-60, and strontium-90, as trend indicators of radiological contamination. On the basis of the results of these measurements, the activities of all other radionuclides such as plutonium-239, radium-226, and uranium-233 are calculated based on ratios obtained from detailed analysis of*

waste streams in the plant. Thus, concentrations of long-lived radionuclides were not directly measured.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: You stated that some of the contaminated areas and soil was not removed because the McLaren/Hart report states that radionuclide activity in the soils at the Oyster Creek Plant are not impacting the offsite concentrations or decreasing over time due to radioactive decay. Where is your proof? (KK-5)

Response: *As stated, the McLaren/Hart report (2000) concludes that limited areas of radioactive contamination in onsite soils are not impacting the offsite environment. This conclusion is based on the extensive onsite soil and groundwater sampling results documented in the report.*

This conclusion is also supported by the results of the REMP that has been conducted around the OCNGS site since 1966. Through this program, radiological impacts on the environment are monitored, documented, and compared with the appropriate standards. The REMP includes monitoring of the concentrations of beta and gamma emitters, iodine, and strontium in the air; concentrations of gamma emitters in surface water, well water, fish, clams, sediment, and vegetation; concentrations of tritium in surface and well water; and direct radiation (gamma dose on thermoluminescent dosimeter locations). For trending purposes, radiological and direct radiation measurements are compared with past years. The only plant-related radionuclide consistently detected is cesium-137 in sediment in the discharge canal and Barnegat Bay, a result of historical plant releases prior to the late 1980s and fallout from nuclear weapons testing.

As described in Section 2.2.7 of the SEIS, in addition to the REMP conducted by AmerGen, the New Jersey Bureau of Nuclear Engineering, within the NJDEP, operates and maintains an ESMP for the four nuclear power-generating stations in New Jersey, one of which is OCNGS. The purpose of the ESMP is to monitor the various pathways by which people and the environment could be exposed to radiation. Data are collected not only beyond the owner-controlled area, but at various locations onsite. Groundwater sampling is conducted within the OCNGS site boundary. Tap water is sampled from the OCNGS site administration building. Direct radiation measurements using thermoluminescent dosimeters are taken at various locations within the OCNGS site boundary, including the independent spent fuel storage facility. In addition, a CREST system is in place that consists of three pressurized ion chamber devices that measure direct radiation at various locations within the OCNGS site boundary, including the independent spent fuel storage facility. Historically, the results of the ESMP are consistent with those collected by the AmerGen REMP.

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The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: What scientific proof do you have that "Wells with elevated levels of radioactive contamination in the Toms River area have been shown to be the result of naturally occurring radioisotopes." What natural isotopes? (KK-6)

Response: *According to the NJDEP, sampling of public and private wells that draw water from southern New Jersey's Cohansey aquifer has shown elevated levels of naturally occurring radioactivity (NJDEP 2006c). The aquifer, sometimes referred to as the Kirkwood-Cohansey aquifer, is present in all, or parts of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean, and Salem Counties. The NJDEP and the U.S. Geological Survey conducted studies to better understand the presence of radioactivity in this aquifer. The results of these studies confirmed that naturally occurring radium-226, radium-228 and radium-224 may be found in elevated concentrations in parts of the Cohansey aquifer (these isotopes are not released in appreciable quantities from OCNGS). Isotopes of radium are not found in the OCNGS waste stream.*

In addition, the REMP conducted around the OCNGS site since 1966 has not shown radioactivity attributable to OCNGS in surface water or groundwater in the vicinity of the site.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: In the discussion of radiological impacts of normal operations, the NRC failed to include the radionuclide impacts to the marine environment. We submitted substantial comments on that and specifically identified the fact that radionuclides have increased in the Barnegat Bay in the bottom sediments and the estuarine biota, and that the reactor-released nuclides have been detected in the water, bottom sediments, benthic marine algae, seagrass, blue crabs, clams, bunker, winter flounder, summer flounder, bluefish, and several other fish.

The organisms collected near Oyster Creek had the highest level of radionuclides, but detectable levels were found throughout the bay. Recent sediments collected near the discharge canal contained levels of Cobalt-60 that were 63 times higher than sediments collected at other locations within the Barnegat Bay.

Now, this issue did not even appear in this EIS that I could find. It wasn't in the section called "Radiological Impacts of Normal Operations". It wasn't listed in any of the other sections. So I'm concerned that when we submitted to your office comments raising this as a concern, and if you wanted to blow off Clean Ocean Action's comments, that's one thing, but the studies that we obtained this information from were the same studies that you reference. So the information was available that this was an ecological risk, and if you wanted to sort of discuss it and label it

small, okay, but you know, I'm concerned that we go to the trouble, a significant amount of trouble, to submit comments, to review these issues carefully, to review them scientifically, legally, and we want to make sure that the process will address our concerns and be fair. So with that, we will be submitting our comments by the September 8th deadline and we trust, I guess, as best we can that they'll be considered. (P-3)

Comment: The Draft GEIS fails to adequately examine the cumulative impacts of radionuclides released from OCNGS on aquatic organisms utilizing Barnegat Bay. Reactor-released radionuclides from OCNGS have accumulated in bottom sediments and the estuarine biota since December 1969 when the facility commenced operation [M.J. Kennish (2001) Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280]. These radionuclides (^{60}Co , ^{137}Cs , ^{54}Mn) bioaccumulate throughout the estuarine food web, and have been detected in water, bottom sediments, benthic marine algae, seagrass, hard clams, blue crabs, bunker, winter flounder, summer flounder, bluefish, and several other fish [Id.]. Organisms collected near Oyster Creek had the highest levels of radionuclides but detectable levels were found throughout the bay [R.L. Blanchard and B. Kahn (1979) Abundance and distribution of radionuclides discharged from a BWR nuclear power station into a marine bay. Nuclear Safety 20: 190-205]. Recent sediments collected near the discharge canal contained levels of ^{60}Co that were up to 63 times higher than sediments collected at other locations within the Barnegat Bay-Little Egg Harbor estuary [F.C. Moser and R.F. Bopp (2001) Particle-associated contaminants in the Barnegat Bay-Little Egg Harbor Estuary. Journal of Coastal Research, SI 32:229-242].

There have been several reported releases of radionuclides into the environment since operations began at OCNGS forty years ago. There are measurable concentrations of several radioactive elements in the aquatic environment at this time and considering the aging infrastructure, additional releases are likely should the plant continue to operate for another 20 years. Thus, there is considerable justification to examine cumulative impacts of past and continued exposure to radionuclides on aquatic organisms utilizing Barnegat Bay. (GG-18)

Comment: Cs 137 and cobalt 50 were found in estuary near Little Egg Harbor. What were the levels? Were other radionuclides found?" (KK-2)

Comment: The SEIS (Part 2, 33 said during the 80's "OCNGS ended the operational releases of liquid radioactive waste discharges and low level radioactive [waste] into Barnegat Bay and Oyster Creek ." Wasn't there concern about the accumulation of 20 years of radioactive discharges to Barnegat Bay and Oyster Creek? (KK-3)

Comment: Clean Ocean Action testified that there is an increase of contamination in the soils and documented and was ignored. Would it make any difference in your assessment? (KK-7)

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Response: *From December 1969 until the late-1980s, the OCNGS periodically discharged liquid wastes containing radioactive contaminants to the discharge canal and Oyster Creek, in accordance with liquid effluent discharge limits specified by the NRC. These liquid discharges occurred as batches and contained water from the reactor system and an onsite laundry. All batches of liquid wastes were analyzed for radionuclide content before discharge to ensure compliance with release limits. Maximum discharges occurred in 1970 to 1972. OCNGS has not routinely released liquid wastes since the late 1980s.*

Radionuclide concentrations in the Barnegat Bay environment have been extensively studied, as documented in the studies referenced (Kennish 2001, Moser and Bopp 2001, and Blanchard and Kahn 1979), among others. These studies demonstrated that radioactive liquid effluents reached all parts of the Bay and provided measurements of radionuclides in biota (e.g., fish, clams, crabs, invertebrates, and marine plants) and sediment samples.

The Blanchard and Kahn study (1979) documents a comprehensive radiological surveillance program in Barnegat Bay conducted by the EPA during the time of maximum OCNGS discharges. The study showed low but detectable levels of radionuclides from OCNGS effluents in fish, clams, and crabs from Barnegat Bay, with those collected near Oyster Creek having the highest levels. The study also showed increased radionuclide concentrations in vegetation and sediment. The primary radionuclides contained in sediment samples were cobalt-60, with concentrations ranging up to 19,000 pCi/kg, and cesium-137, with concentrations ranging up to 2000 pCi/kg. The highest sediment concentrations were also observed near Oyster Creek. For comparison, background sediment samples ranged up to 20 pCi/kg for cobalt-60 and 450 pCi/kg for cesium-137 (there is no isotope called cobalt-50).

The Blanchard and Kahn study also included estimates of the radiation dose to MEIs from consuming contaminated seafood and beach exposures to contaminated sediments. The estimated doses were less than 1 mrem per year, much less than regulatory limits and the average dose from background of approximately 360 mrem per year in the United States.

In addition to the studies mentioned above, a REMP has been conducted around the OCNGS site since 1966. Through this program, radiological impacts on the environment are monitored, documented, and compared with the appropriate standards. Among other measurements, the REMP includes monitoring of the concentrations of gamma emitters in surface water, fish, clams, crabs, and sediment of Barnegat Bay, with samples collected primarily in the vicinity of the site. For the years 2000 to 2004, the latest years for which data were available, the only plant-related radionuclide consistently detected has been cesium-137 in sediment, a result of the historical plant releases that ceased in the late 1980s as well as fallout from atmospheric testing of nuclear weapons. The sampling results for fish (including tautog, flounder, weakfish, striped bass, white perch, sea bass, bluefish, and puffer), clams, and crabs did not indicate plant-related radionuclide contamination.

For trending purposes in the REMP, radiological measurements are compared with results from past years. The trend analyses for 1984 to 2004 reveal significant reductions in measured radionuclide concentrations in clams and sediments near OCNGS. For example, mean cobalt-60 concentrations in 1984 were approximately 12 pCi/kg in clams and 250 pCi/kg in sediments. By the late 1990s, cobalt-60 concentrations in clam and sediment samples were equal to background levels. A similar, but less rapid, decrease has been observed for cesium-137 in sediments; in 1984, mean cesium-137 concentrations in sediment samples were approximately 500 pCi/kg, decreasing to a mean of 30 pCi/kg in 2004. In part, these reductions are the result of the cessation of liquid discharges and radioactive decay (cobalt-60 has a half-life of 5.3 years and cesium-137 has a half-life of 30 years).

As noted in Kennish (2001), radionuclide concentrations measured in Barnegat Bay in samples of biota and sediment are well within government regulatory limits for environmental and biotic media. Moreover, there is no evidence that radioactive releases from OCNGS have affected biota or impacted habitats in the Barnegat Bay-Little Egg Harbor estuary. As noted above, OCNGS has not routinely released liquid radioactive wastes since the late 1980s and has no plans to resume doing so. However, any potential future releases would be required to meet NRC regulations, and as such, would not be expected to result in significant impacts on members of the public or the environment.

Although the data were reviewed during preparation of the draft SEIS, the draft did not contain a detailed discussion of sediment contamination or potential impacts on the marine environment. Consequently, additional information concerning radionuclide contaminants from liquid OCNGS discharges has been added to Section 2.2.7 of the SEIS.

The text of the SEIS has been modified in response to these comments.

Comment: Environmental Impacts of Operation, Transmission Lines (Pages 4-25 through 4-31) New Jersey's original draft power line regulation addressed only new or modified lines. The policy of prudent avoidance was used as a basis for the draft. Therefore, only new or modified power lines were to use mitigation techniques to lower magnetic fields. (It was assumed that more of these fields were worse.)

Many years later, research results are still contradictory in this area. The International Commission on Non-ionizing Radiation recommends 833 milligauss as a public exposure limit, based on acute effects. No power line in New Jersey will have levels that high underneath them. IEEE recommendations are even less conservative.

Since no new transmission lines are within the scope of this GEIS (2-15, line 25 and 26), it would not be recommended that the utility take any action to reduce magnetic fields.

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The RPRP does not see any data in the report that indicates what the magnetic fields are under or at the edge of the ROW (average and maximum). The Department is requesting this information in order to respond to public inquiries. The Department is concerned that electric current could substantially increase over the years thus increasing the magnetic field under the line. What is the utility's plan for this eventuality? (PP-5)

Response: *The NRC staff's environmental review includes an evaluation of the impacts of electromagnetic fields associated with the transmission lines, and this evaluation can be found in Section 4.2.2. The NRC staff has come to the conclusion that these impacts are still unknown, and has not requested any additional information from the applicant regarding the electromagnetic field strength under the lines. The staff will continue to follow developments on this issue. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.7 Comments Concerning Socioeconomic Issues

Comment: Page Number 2-83, Line Number 18-20. What it is in DEIS: Revenues are used by each taxing entity to fund local and county emergency management programs, public safety, local public schools, local government operations, local road maintenance, and the local library system. What it should be changed to: Revenues are used by each taxing entity to fund local and county emergency management programs, public safety, local public schools, local government operations, local road maintenance, and the local library system. Why: Funding for local and county emergency management programs is funded by a levy placed on AmerGen by NJ under the Radiation Protection Act, not through local taxing entities. (II-2)

Response: *The text has been changed to more accurately reflect the distribution of local tax revenues to the various local government expenditure programs.*

Comment: Section 2.2.8.2, Public Services, Water Supply. Some of the numbers on Table 2-9 maybe outdated. For instance, United Water has exceeded its allocation several times and has been trying to get an increase. They have activated their interconnection with Lacey Township MUA to supply some of their additional water requirements. Nowhere is a listing of other ground water diversions such as the Jersey Central Power & Light diversion. (PP-64)

Response: *The text in Section 2.2.8.2 and in Table 2-9 has been modified to reflect changes in the water supply system in the area surrounding the plant.*

Comment: Oyster Creek produces enough energy to power 600,000 homes and adds \$52 million a year to the local economy. We contributed \$202,000 last year to the United Way and over half a million dollars to the United States over the last three years. We contributed \$80,000 last year to the DEP Fish and Wildlife Department and \$5,000 to the Audubon Society to help clean waterfowl affected by the Delaware River oil spill. (M-2; S-4)

Response: *The comment is noted. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: And I certainly appreciate the electrical union wanting to keep their people working. I know that's your job, but there's better stuff to do than work at a nuclear plant. (Y-7)

Response: *The comment is related to employment at OCNGS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Land Use

Comment: The DEIS references (2-18) the CZMA inconsistency determination reached by NJDEP on August 19, 2005 and states that the determination was made based on a lack of information. The CZMA determination did point out the places in which no determination could be made because of a lack of information, but the NJDEP also made separate findings of inconsistency and highlighted several major issues. Specifically, the NJDEP found that the applicant was not in compliance with Basic Coastal Policy 5 and the Public Access to Waterfront Rule. August 19, 2005 CZMA Determination at 10. (MM-19)

Response: *The text in Section 2.2.1 has been changed to provide additional detail on the status of OCNGS Coastal Zone Management Act compliance.*

Cultural Resources

Comment: How can NRC draw any conclusions with respect to archaeological resources when no study was completed prior to construction? The DEIS suggests that there is some dispute as to the presence of historic resources on the site. (MM-53)

Response: *The OCNGS was issued a construction permit in 1964 and started operating under a provisional operating license in 1969. The original regulations, implementing Section 106 of the NHPA (36 CFR Part 800), were promulgated in 1979, 15 years after the U.S. Atomic Energy Commission (AEC) issued the construction permit for OCNGS and 10 years after OCNGS started operating. The Advisory Council on Historic Preservation had no prescribed regulatory process for Federal agencies to demonstrate compliance with NHPA Section 106 responsibilities until 1979.*

The AEC did conduct a review of historic sites in its FES related to the operation of OCNGS prior to issuance of a full-term OL (AEC 1974). The AEC provided reference to the Curator of Cultural History at the New Jersey State Museum and the Historic Sites Office of the NJDEP, both indicating no evidence at the time of archaeological sites within the station boundary, no National or State Register sites in the area, and no historical or architectural structures

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impaired. However, the Historic Sites Office did suggest further study of possible archaeological sites (AEC 1974).

AmerGen submitted an application for renewal on July 22, 2005, pursuant to 10 CFR Part 54. The NRC has established that, as part of the staff review of any nuclear power plant license renewal action, a site-specific SEIS to the GEIS, NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC rules that implement NEPA. In accordance with 36 CFR Part 800.8(c), the SEIS includes an analysis of potential impacts on historic and archaeological resources.

As stated in the SEIS, as part of this site-specific environmental review, the NRC staff contacted both the New Jersey State Historic Preservation Office (SHPO) and the Pinelands Commission regarding the proposed action and requested comment. Additionally, the staff conducted a site file search at the New Jersey SHPO office in Trenton, New Jersey, on October 13, 2005. On the basis of the file search, it appears that one archaeological site may be located on the Finninger Farm portion of the site according to Pineland Commission records. The potential for additional sites to be present is noted in the SEIS because of the environmental setting and the land use history of the site.

The NRC staff is able to draw conclusions with respect to archaeological sites because the potential for impact on undiscovered archaeological resources depends mainly on whether the land will be disturbed, in addition to how likely the land is to contain archaeological deposits. Since it has been determined that because of the setting of the OCNGS facility archaeological deposits could be present, the analysis of archaeological resources presented in the SEIS is based on the potential for there to be future land disturbance that could impact unknown resources. As stated in the applicant's ER, AmerGen does not plan to undertake any refurbishment or replacement activities (including land-disturbing activities) at the plant site (or along the existing transmission line corridor) during the license renewal period. Since AmerGen has committed to no refurbishment or replacement activities and has procedures in place to identify and protect unknown archaeological resources prior to any ground-disturbing activities, the continued operation of OCNGS would likely protect any cultural resources that are present. Therefore, the NRC has concluded in the SEIS that impacts on archaeological resources would be SMALL.

The comment presents no new and significant information, therefore, no changes were made to the SEIS text.

Environmental Justice

Comment: The NRC staff used data from the 1990 Census to evaluate low-income populations, and data from the 2000 Census to evaluate minority populations within a 50 mile

radius from the facility. The EJ Program questions the use of 1990 data to evaluate low-income populations given the fact that 2000 data are available.

The GEIS did not take into consideration the projected explosive population growth and changing demographics in this area of New Jersey in their evaluation of potential adverse impacts on low-income and minority communities for the next 20 years of operation.

The NRC staff concluded that "it found no unusual resource dependencies or practices such as subsistence agriculture, hunting or fishing that would be impacted by OCNGS license renewal." Again, given the time constraint associated with this review, it was difficult to confirm this statement. However, the EJ Program has knowledge that in many areas within the 50 mile-radius evaluated in the EIS, low-income and minority communities are engaged, to a certain extent, in subsistence fishing and farming. So, the pathways through which the environmental impacts associated with OCNGS license renewal can affect human populations need to be reevaluated. (QQ-11)

Response: *Census data from 2000 were used to describe the distribution of low-income populations within 50 mi of the plant. The text in Section 4.4.6 has been modified to accurately reflect the data source used in the evaluation.*

Although total population in the area surrounding the plant has grown rapidly since 1970, with growth expected to continue during the license renewal period, the impact of license renewal on environmental justice does not take growth and changes in the geographic distribution of low-income and minority populations into account as these cannot be accurately predicted at this time.

Although it may be the case that subsistence farming and fishing may be used by low-income and minority populations in the area surrounding the plant, the analysis determined that there were no food pathways associated with plant operation during the license renewal period that would affect these population groups.

A.2.8 Comments Concerning Postulated Accidents

Comment: Mark 1 design: The obsolete Mark 1 reactor design of OCNGS would not meet current licensing standards. This design-based defect means that in the event of an accidental buildup of pressure inside OCNGS, the only means to avert a core meltdown would be the intentional release of radioactivity directly into the environment. This design flaw poses unacceptable risks to public health and safety, and should not be grandfathered into a license extension. In light of this site-specific design flaw, how did the NRC conclude that there are no DBA threats at OCNGS beyond those discussed in the GEIS? (EE-5)

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Response: *Many changes were made in the nuclear industry in response to the accident at Three Mile Island. These changes were implemented during the 1980s and resulted in a reduction in the risks associated with severe accidents. During the 1990s, Individual Plant Examinations (IPEs) were conducted at all operating plants using probabilistic risk assessment (PRA) techniques to identify any design or operational vulnerabilities to severe accidents. For plants with Mark I containments, the NRC staff identified certain containment performance improvements that would reduce the vulnerability of the containment to severe accident challenges. These included a requirement to provide a hardened wetwell vent (Generic Letter 89-16) and a recommendation to consider several additional enhancements for implementation during the IPE, that is, alternate water supply for drywell spray/vessel injection, enhanced reactor pressure vessel depressurization system reliability, and implementation of revised emergency procedure guidelines (Generic Letter 88-20, Supplement 1). The results of the IPEs assure that any severe accident vulnerabilities were identified and eliminated, and show that the residual level of risk for this specific Mark 1 containment is acceptably small to meet NRC's safety goals.*

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Back-up power: In the evaluation of risks, loss of on-site power accounts for 40% of core damage frequency (CDF) risk (Ibid.). AmerGen has not proven their ability to provide sufficient back-up power in the event of station blackout for the renewal period (NJDEP, ASLB No. 06-844-01-L.R.). (EE-7)

Response: *OCNGS meets all regulatory requirements related to electrical power and station blackout. Furthermore, the results of the plant-specific risk assessments for OCNGS show that the residual level of risk is acceptably small to meet NRC's safety goals. Although events initiated by loss of offsite power account for a significant fraction of the internal events core damage frequency (CDF) at OCNGS, the actual CDF for station blackout events is small and generally consistent with that for other plants.*

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Reactor vulnerabilities to climatic fluctuations: The impacts of Climate Change on water and atmospheric temperatures present a significant threat to the future operation of reactors with once-through cooling systems. OCNGS is a MARK 1 design Boiling Water Reactor model and utilizes water from the Forked River as its primary cooling agent. When the water drawn in from a lake or river is too warm to maintain a differential between steam and the condenser, the plant cannot operate. Therefore, as water temperatures continue to rise during summer heat-waves, OCNGS will become an increasingly unreliable and unsafe source of electricity generation.

Over the coming decades, global warming is likely to usher in additional threats to OCNGS operational safety in the form of flood waters from rising levels in the Atlantic Ocean which adjoins Barnegat Bay and increased vulnerability of back-up power to blackout from increased frequency and strength of extreme weather events, particularly hurricanes and Nor'easters. As temporary shut-downs from extreme heat and weather become more common, nuclear power will become less and less reliable, especially during peak demand across summer months, and more susceptible to accidents. (EE-10)

Response: *Every U.S. nuclear power plant is designed to withstand design-basis events, including flooding, hurricanes, and tornadoes. These events are evaluated in the GEIS, which concludes that the environmental impacts resulting from these threats would be SMALL. Even if OCNGS were to lose all offsite power, the station has backup sources of power, including the combustion turbines just west of the OCNGS site and the onsite emergency diesel generators. These generators would allow OCNGS to shut down safely. Systems and procedures at the plant are designed to present timely response to severe weather events and to ensure that the plant can be shut down safely if needed. In addition, the NRC Operations Center monitors severe weather events and coordinates with licensees during these events to ensure safe operation and shutdown, if needed.*

The commenter also mentions the possibility that an increase in the intake water temperature could cause an increase in turbine backpressure, leading to reactor shutdown. It is anticipated that such temperature changes would be gradual, and the applicant would take measures to ensure that it could continue to operate either by reducing the thermal power of the reactor or by implementing alternatives to the cooling system. Therefore, it is unlikely that an increase in the temperature of Forked River due to climatic changes would cause an inadvertent shutdown. Even if this were to occur, systems and procedures are in place to ensure that the plant would shut down in a safe manner.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: While the supplemental EIS is not required to discuss either the need for power or an economic cost/benefit analysis of alternatives, the extreme risk of an accident at OCNGS as it ages and implicit threats to public safety and the regional economy posed by continued operation should be considered on a site-specific basis. (EE-18)

Response: *Chapter 5 of the SEIS discusses the postulated accidents that the NRC staff has evaluated and the mitigation alternatives considered. The aging aspects of OCNGS is specifically addressed in the safety review of the license renewal application and is outside the scope of the environmental review. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

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Comment: Environmental Impacts of Postulated Accidents (Pages 5-1 through 5-11, Appendix G). In light of NRC approved NEI 05 01 (rev A) Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document, AmerGen should revise the draft SEIS. The submittal did not include a specific review for Individual Plant Examination for External Events (IPEEE). The information used to develop the basis for external events such as tornados, floods, earthquakes, fires, and sabotage is 10 years old. Additionally, while AmerGen did use specific information for the internal Individual Plan Examination, they did not use the same method for the IPEEE and simply applied a factor of 2 to make a risk determination. This method is clearly imprecise and may result in incorrect judgments. The list of potential fixes to improve the plant, which is located in Appendix G of the GEIS, may not be accurate as a result of this generic analysis. (PP-8)

Response: *The SAMA guidance document is intended to clarify NRC and industry expectations regarding the type of information and analyses that would be included in the SAMA portion of a license renewal applicant's ER. It is expected that inclusion of such information would improve the quality of the license renewal application and result in a reduction in the number of SAMA-related requests for additional information (RAIs) from the NRC. Failure to provide the information called out in the guidance document or to address the topics at an appropriate level of detail would not imply that the applicant's SAMA analysis is flawed or incomplete, but rather would provide a basis for the NRC to request additional information in those areas. AmerGen performed a detailed assessment of SAMAs and documented this assessment in the ER. The information provided in the ER was extensive, and generally responsive to the guidance in NEI 05-01 (NEI 2005). Nevertheless, the NRC identified several areas where additional information or analyses were deemed necessary to support the NRC staff's evaluation. AmerGen provided further details and analyses via formal RAI responses. The NRC considers that the information contained in the ER and the RAI responses adequately addresses all areas identified in NEI 05-01 and provides a sufficient basis to support the staff's evaluation of SAMAs for OCNCS.*

AmerGen performed a plant-specific search for SAMAs for the dominant external event risk contributors at OCNCS, and quantified the benefits and implementation costs of these SAMAs based on plant-specific considerations. This evaluation utilized insights from the best available risk studies, which included a 2006 update of the OCNCS fire PRA (completed subsequent to the ER submittal), and a 2000 revision of the OCNCS seismic PRA (revised during the Individual Plant Examination of External Events [IPEEE] review). For SAMAs intended primarily for internal events, AmerGen applied a multiplier of 2 (to the internal events benefits) to conservatively account for potential benefits of those SAMAs in external events. However, for external event SAMAs, the benefits were estimated based on use of the plant-specific external event risk models, and the multiplier was not applied. The approach for estimating the SAMA benefits (i.e., risk reduction) is discussed in Section G.4 of the SEIS, and the NRC considers the applicant's approach adequately conservative in its methodology.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: No one expected a tsunami wave to sweep across Indonesia, leaving a swath of death and destruction. No one thought a category 5 hurricane would strike the Gulf coast, causing levees to collapse in New Orleans. No one believed terrorists could fly into the world trade center, collapsing the twin towers and killing almost 3,000 people. No one expects a nuclear accident of catastrophic proportions at Oyster Creek, but should we trust the oldest nuclear plant in the U.S. to operate safely for another 20 years? (XX-1)

Response: *Tsunamis were not considered within the SAMA analyses. This is because the risks of a tsunami leading to core damage are so small relative to the risk from other initiating events, that we would not expect to identify any tsunami-related SAMAs that would substantially reduce the overall plant risk. High wind and hurricane events are considered within the set of events that the plant has been designed to withstand. External events more severe than the design-basis events were further evaluated as part of the IPEEEs conducted in the mid-1990s. These include seismic, fire, high wind and hurricane, and tornado events. As discussed in Appendix G, the CDF from high winds and tornados is estimated to be less than 1×10^{-6} per year. Although these events represent a small fraction of the total CDF, potential improvements to further reduce this risk contribution were explored within the SAMA analysis.*

Section 5.1.2 discusses the impacts of severe accidents, including sabotage. The GEIS findings state that compliance with the NRC regulatory requirements under 10 CFR Part 73 provide reasonable assurance that the risk from sabotage would be SMALL. Even if such events were to occur, the Commission would expect that resultant core damage and radiological releases would be no worse than that expected from internally initiated events. On the basis of the above, the Commission concludes that the risk from sabotage and beyond-design-basis earthquakes at existing nuclear power plants would be SMALL and additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Failure to perform an in-depth study on the environmental impact of a severe accident when considering the risk in operating an aged nuclear plant with documented problems of corrosion of its drywell, the containment barrier necessary for protection of the public from the effects of radiological releases, for another 20 or more years is unacceptable. (YY-4)

Response: *Drywell liner corrosion will not impact the severe accident response at Oyster Creek. Compliance with the plant licensing basis will assure that the containment pressure*

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boundary, including the drywell liner, maintains its structural integrity up to the design-basis pressure of 62 pounds per square inch (psig). Although some beyond-design-basis accidents could result in loss of containment heat removal and gradual pressurization of the containment, the Oyster Creek plant is equipped with a "hardened vent system" that would be used to reduce containment pressure prior to exceeding the design basis pressure. The plant-specific Emergency Procedure and Severe Accident Guidelines direct the operator to use the hardened vent system to control containment pressure prior to the pressure reaching 55 psig. The release path would generally be through the suppression pool, where fission products would be scrubbed prior to release to the environment. Because the containment pressure will not exceed the design-basis pressure, and because containment integrity will be assured up to the design-basis pressure even with corrosion, severe accident response will not be impacted by corrosion.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: The recent DEIS, issued by the Nuclear Regulatory Commission, states there are no environmental impacts that would preclude renewing the operating license extension of Oyster Creek. According to the report, the Commission has determined that the adverse environmental impacts of license renewal would not prevent energy planning decision makers from granting the operating extension.

As I understand it, the NRC conducted a thorough analysis to reach this determination. However, I am concerned the environmental impacts of a potential atmospheric release of radiation have not been adequately addressed in this report. In 2005, the National Academy of Sciences (NAS) released a report evaluating the potential risks of boiling water reactor (BWR) plants with above ground spent fuel pools. The report, entitled Safety and Security of Commercial Spent Fuel Storage, found the potential vulnerabilities of BWR pools are plant-design specific, and recommended that, "The Nuclear Regulatory Commission should undertake additional best-estimate analyses to more fully understand the vulnerabilities and consequences of loss-of-pool coolant events that could lead to a zirconium cladding fire."

Although the DEIS contains a specific section regarding Severe Accident Mitigation, I inquire as to whether or not the NAS suggested analysis was incorporated into the statement? We must not underestimate the catastrophic impacts to our' environment in the event a cooling pool is compromised.

I have long supported the involvement of an independent and unbiased third party, such as the NAS, in the license renewal process of Oyster Creek. Additionally, I support the inclusion of their suggested analysis in the Final Environmental Impact Statement (FEIS), and urge the NRC to make every effort to do so. (ZZ-1)

Comment: The License Renewal GEIS purports to address both design-basis accidents and severe accidents. With respect to design-basis accidents, the GEIS provides a brief statement that the impacts of design-basis accidents were considered in the original EIS for each nuclear power plant, and that the design was found adequate to "accommodate" those accidents. License Renewal GEIS at 5-11. Moreover, the GEIS asserts that the consequences of design-basis accidents are not expected to change significantly as a result of aging of the plant. *Id.* Therefore, the GEIS does not provide a further discussion of design-basis accidents. *Id.* These impacts are also classified as "Category 1 in Table B-1 of Appendix B to Subpart A of 10 C.F.R. Part 51. However, this approach fails to recognize that the build up of spent fuel at reactors is effectively an effect of aging, and that a new design-basis accident could arise from the storage of the spent fuel. (BBB-7)

Response: *Events involving fuel stored in the spent fuel pool are not addressed in the SAMA analysis. The Atomic Safety and Licensing Board, in LBP-06-07, states, "because on-site spent fuel is a Category 1 issue, New Jersey's contention challenging AmerGen's SAMA analysis for failing to consider Oyster Creek's spent fuel pool is beyond the scope of this proceeding and, thus, not admissible." Spent fuel pools are robust structures constructed of very thick steel-reinforced concrete walls and possess a stainless steel liner. They contain enormous quantities of water, and as a result for most events, plant operators would have significant amounts of time to correct any problems. In addition, nuclear plants possess many other sources of cooling water that are readily available for cooling spent fuel. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: The DSEIS states that the value of eliminating all internal and external severe event risk is \$4.46 million, DSEIS at G-12, but fails to provide any elaboration about how this estimate was derived. Working backwards, a consequence of \$100 billion at a probability of 1×10^{-5} per year has a present value of around \$15 million. Risk Report at 9-2. Because the CDF in the analysis is close to this level of probability and the screening value is around a third of the present value estimated, the consequences assumed in the analysis to derive the screening value must be of the order of \$33 billion [This is a simplistic calculation made for illustrative purposes only]. This amount is confirmed by the assumption in the appendix that the total cost of cleanup and decontamination after a severe accident would be \$110 billion. DSEIS at G-28. This is surprising because the NRC has previously found that destruction of a private spent fuel storage facility would have lower consequences than a severe nuclear accident. NRC, CLI-01-22 Memorandum and Order, 54 NRC 255 (November 14, 2001). Beyea also points to another reason why the consequence estimate is far too low in the DSEIS. The standard value of \$2,000 per person-rem used in the report, DSEIS at G-28, leads to a valuation of an avoided cancer death of \$200,000, which is far too low. Consequence Report at 14. This means the SAMA analysis at Oyster Creek must be recalculated placing a much higher value on the lives of the public who live close to the plant.

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In addition, an assumption of \$33 billion in consequences would contrast starkly with the estimate of consequences from a spent fuel pool fire of \$180 billion to \$3.6 trillion and is at variance with the NRC's previous position that a spent fuel facility accident would be of less consequence than an accident involving core damage. The Risk and Consequence Reports taken together suggest that the DSEIS has failed to assess the dominant source of risk at the Oyster Creek site. It is important to remember that when the plant was initially licensed the risk from the spent fuel pool was zero, because the pool was empty. In addition, the NRC did not intend to allow spent fuel to be packed in pools in the way it is now. Although NRC may have looked at the chance of a spent fuel pool fire during decommissioning, no generic assessment of the risk from spent fuel fires during operation has been carried out. Because the risk of a spent fuel pool fire now appears to dominate the risk presented by the plant, it quite extraordinary that the DSEIS fails to address the issue in detail. Producing an evaluation that grossly underestimates the risk of an action is actually worse than producing no assessment, because it may well lead to a decision based on a completely false assurance about risk levels. This is exactly what Congress intended to prevent when it enacted NEPA. (BBB-10)

Response: *The methodology used to estimate the dollar benefits of reducing or eliminating severe accident risk is based on NRC guidance for performing cost-benefit analysis, that is, NUREG/BR-0184, Regulatory Analysis Technical Evaluation Handbook. The application of this methodology to OCNCS is described in Section G.6.1 of the SEIS. In addition, the monetary worth of \$2000 per person-rem is a standard valuation for comparison purposes recommended by NUREG/BR-0058, Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission.*

The risk from fuel stored in the spent fuel pool is not addressed in the SAMA analysis. The Atomic Safety and Licensing Board, in LBP-06-07, states, "because on-site spent fuel is a Category 1 issue, New Jersey's contention challenging AmerGen's SAMA analysis for failing to consider Oyster Creek's spent fuel pool is beyond the scope of this proceeding and, thus, not admissible." Spent fuel pools are robust structures constructed of very thick steel-reinforced concrete walls and possess a stainless steel liner. They contain enormous quantities of water, and as a result for most events, plant operators would have significant amounts of time to correct any problems. In addition, nuclear plants possess many other sources of cooling water that are readily available for cooling spent fuel. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: The DSEIS suggests that there is no new significant information that leads to questions about the validity of the GEIS. DSEIS at 5-3. This is totally incorrect. The information presented by Thompson and Bayea is itself significant new information about the risks posed by the operation of BWR Mark 1 reactors. In addition to the analysis of spent fuel pool fire risks, Bayea also shows that new studies indicate that low-level radiation does could cause more cancers than thought when the GEIS was written in 1996. Consequence Report at

12-15. Both the Risk Report and the Consequence Report were submitted to the NRC on May 25, 2006, before the DSEIS was finalized in June 2006. (BBB-11)

Response: *This comment refers to two reports that assess the probability and impacts of spent fuel fires caused by terrorist attacks and accidents. The first was prepared by Gordon R. Thompson, entitled Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants. The second report was prepared by Jan Beyea, entitled Report To The Massachusetts Attorney General On The Potential Consequences Of A Spent-Fuel-Pool Fire At The Pilgrim and Vermont Yankee Nuclear Plants.*

In a letter dated May 10, 2005, the NRC responded to the issue of spent fuel storage safety at OCNCS. In other similar letters to Congressional representatives, the NRC responded to several requests to conduct an independent review of the safety and security of commercial spent fuel storage, following the release of a report created by the National Academy of Sciences, entitled Safety and Security of Commercial Spent Nuclear Fuel Storage. In its response, the NRC wrote that it "has taken or is taking effective actions to address these issues. The NRC is confident that spent fuel is stored in a manner that provides reasonable assurance that public health and safety, the environment, and common defense and security are adequately protected."

In addition, the risk from fuel stored in the spent fuel pool is not addressed in this SEIS as part of the SAMA analysis because the Atomic Safety and Licensing Board, in LBP-06-07, states, "because on-site spent fuel is a Category 1 issue, New Jersey's contention challenging AmerGen's SAMA analysis for failing to consider Oyster Creek's spent fuel pool is beyond the scope of this proceeding and, thus, not admissible." Spent fuel pools are robust structures constructed of very thick steel-reinforced concrete walls and possess a stainless steel liner. They contain enormous quantities of water, and as a result for most events, plant operators would have significant amounts of time to correct any problems. In addition, nuclear plants possess many other sources of cooling water that are readily available for cooling spent fuel.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: NRC provides a completely inadequate justification for the use of a factor of 2 times the benefit of SAMAs designed to mitigate internal events to take account for external events, including sabotage. DSEIS at 8-9. This seems totally arbitrary because it is not necessarily true that mitigation measures to prevent sabotage and earthquakes would also mitigate risks from internal events. As discussed above, the screening level of \$4.46 million, DSEIS at G-12, is unjustifiably low and must be revised substantially to take account of new cancer risk studies, higher values of life, and the substantial risks presented by the accidental triggering of a spent fuel pool fire during operation, as well as the risk of terrorism. It is notable that Amergen's

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process failed to focus on the risk of terrorism or of a spent fuel pool fire. DSEIS at G-13. Thus, NRC's conclusion that the process was systematic and comprehensive is totally wrong. DSEIS at 14. In addition, the Risk and Consequence reports show that NRC's conclusion that there are no impacts related to design basis accidents beyond those discussed in the generic EIS is false. DSEIS at 5-3. (BBB-13)

Response: *For SAMAs intended primarily for internal events, a multiplier of 2 was applied to the internal events benefits to conservatively account for potential benefits of those SAMAs in external events. The basis for the multiplier is discussed in Section G.2.2 of the SEIS. However, for external event SAMAs, for example, seismic and fire, the benefits were estimated based on the use of the plant-specific external event risk models, and the multiplier was not applied. The approach for estimating the SAMA benefits for these SAMAs is discussed in Section G.4 of the SEIS. Additionally, compliance with the NRC regulatory requirements under 10 CFR Part 73 provides reasonable assurance that the risk from sabotage is SMALL. Even if such events were to occur, the Commission would expect that resultant core damage and radiological releases would be no worse than those expected from internally initiated events.*

The methodology used to estimate the dollar benefits of reducing or eliminating severe accident risk is based on NRC guidance for performing cost-benefit analysis, i.e., NUREG/BR-0184, Regulatory Analysis Technical Evaluation Handbook. The application of this methodology to OCNCS is described in Section G.6.1 of the SEIS. In addition, the monetary worth of \$2000 per person-rem is a standard valuation for comparison purposes recommended by NUREG/BR-0058, Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

A.2.9 Comments Concerning Uranium Fuel Cycle and Waste Management Issues

Comment: Spent fuel contains dangerous radioactive stuff, some of which will take about 250,000 years to completely decay. I have heard -- well, let me continue. Twenty-six years after the project's 1979 inception, the geologically stable Yucca Mountain storage site is still empty and I think under some construction. And 26 more years worth of spent fuel sits outside Oyster Creek's containment in our lovely and heavily populated state. (C-5)

Comment: Given our state's population and our precious shore communities adjacent to Oyster Creek, we really need to do something effective now concerning spent fuel and perhaps safety. (C-6)

Comment: Spent fuel storage: While supplemental EIS for license renewal is not required to address and aspect of spent fuel storage, there are significant site-specific consideration at OCNCS that cannot be overlooked or assumed sufficiently accounted for the in the GEIS. New

Jersey as a whole has already reached a critical point in spent fuel storage capacity, OCNGS having surpassed storage pool capacity in 2002 and Hope Creek to exceed storage limits in 2008. If OCNGS is re-licensed for twenty additional years of operation, the NJ Public Interest Resource Group has calculated that it will generate an additional 640 metric tons of waste with nowhere to go, inevitably adding to operation costs and increased rates for consumers in the region. The dry cask storage system currently in place at OCNGS does not fully address the issue of spent fuel rod crowding in the pool or vulnerability of waste to attack. Waste generated during the proposed renewal period would necessitate building more dry cask units. (EE-14)

Comment: During the relicensing period, the total amount of spent fuel at the Facility will continue to increase. Why is the long-term impact of this stockpiling not discussed in the DEIS and considered? (MM-70)

Comment: Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31) "Radiation doses to the public will continue at current levels associated with normal operations" Another twenty years of operation will impact the size of the interim spent fuel storage facility. What are the dose estimates for what the public might be exposed to at the fence line throughout the operation of the OCNGS ISFSF pending the siting of a permanent repository? (PP-6)

Comment: Furthermore, if NRC wishes to proceed with relicensing, it must also complete the evaluation of the site specific consequences of adding yet more fuel to the dry cask store over the next twenty years. (BBB-3)

Comment: In our previous comments we complained that NRC had failed to assess the effects of the potential accumulation of spent fuel on the site if the reactor continues to operate beyond the term of the existing license. This situation has been made even more likely by the Department of the Interior's recent decisions not to allow a private spent fuel repository to be constructed. I attach these decisions, which the NRC should regard as significant new information.

This new information underscores that an off-site spent fuel repository is unlikely to open for at least 20 more years. Thus, it is completely foreseeable that spent fuel would accumulate further on the site, if the license extension were granted. This issue must therefore be addressed in the DSEIS, which would otherwise fail to meet the requirements of NEPA to look at the foreseeable environmental consequences of major federal actions. (CCC-1)

Response: *Onsite storage of spent nuclear fuel is a Category 1 issue. The safety and environmental effects of long-term storage of spent fuel onsite have been evaluated by the NRC, and, as set forth in the Waste Confidence Rule, the NRC generically determined that such storage can be accomplished without significant environmental or human health impact. In the Waste Confidence Rule, the Commission determined that spent fuel can be safely stored onsite*

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for at least 30 years beyond the licensed operating life, which may include the term of a renewed license. The NRC has a certification process for onsite waste storage casks, regulated by 10 CFR Part 72. Spent fuel is under continual licensing control. Siting of a waste repository offsite is a separate regulatory action involving the U.S. Department of Energy (DOE). The commission has determined that onsite spent fuel storage in pools and in dry cask storage facilities is a safe interim storage alternative. The comments do not provide new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: One of the Department of Energy's (DOE) goals in its 2005 budget is to identify opportunities for recycling spent fuel, and a DOE lab is testing a process to make reprocessing spent fuel more viable. However, the draft SEIS did not address the issue of spent uranium fuel recycling in its discussion of the Uranium Fuel Cycle. Recycling spent fuel reduces the need to mine more uranium, which has significantly damaging effects to the environment, and reduces the security risk to the facility. Since there has been significant progress in the area of recycling spent uranium fuel from commercial nuclear power plants, we believe that the final SEIS should address the issue of recycling and the likelihood that Oyster Creek may employ some recycling technology in the future. (HH-15)

Response: *Reprocessing of spent nuclear fuel involves the chemical treatment of the fuel to separate unused uranium and plutonium from radioactive fission products. Spent nuclear fuel can be reprocessed and recovered uranium and plutonium can be used in new fuel assemblies. When most U.S. nuclear plants were built, the industry, with the Federal government's encouragement, planned to recycle or reprocess used nuclear fuel. In 1979, a decision was made by President Carter to ban commercial nuclear fuel reprocessing because of concerns about possible proliferation of weapons-grade material. President Reagan lifted the reprocessing ban in 1981; however there was little or no interest in pursuing reprocessing by the nuclear industry. In early 2006, DOE announced a new initiative called the Global Nuclear Energy Partnership, which envisions the development and deployment of a closed fuel cycle that enables the recycling and consumption of long-lived radioactive waste, which includes the reprocessing of spent fuel. OCNGS has not stated its intention to employ some recycling technology in the future. However, the licensing of any U.S. reprocessing facility in the future would be done under the NRC's regulatory purview, and the environmental impacts of the fuel reprocessing cycle would be evaluated under that licensing process and its associated EIS. Any realistic reprocessing capability within the U.S. will take years to develop. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: We recommend that the final SEIS address opportunities for pollution prevention and waste recycling. (HH-3)

Comment: The draft SEIS was also silent on the issue and options for pollution prevention (P2). The final SEIS should discuss the internal and external processes and the waste streams

that would be candidates for pollution prevention technologies. Some P2 opportunities can range from actions as simple as specific landscaping and reduction of herbicides within OCNCS grounds to the reduction of sanitary or hazardous (non-radioactive) waste generation rates. We encourage consultation with the DOE'S Pollution Prevention office to obtain recommendations that would fit with the processes at Oyster Creek. (HH-16)

Response: *Section 2.1.5 has been revised to provide a better description of the waste streams and the means for non-radiological waste disposal at OCNCS. While the SEIS discloses potential impacts of non-radiological waste pollution to the environment per NEPA, implementation of pollution prevention measures at OCNCS are implemented under the NJDEP and local government mandates, and is not within the NRC's regulatory purview. Therefore, the SEIS does not make recommendations regarding P2.*

Comment: A main point you may wish to keep in mind is that in terms of ease of transfer not all nuclear fuel is created equal. Over the years in which the fuel has been irradiated there has been a wide variety in the "cladding" of the fuel assemblies. Some of the assemblies are easy to move around; some may be extremely difficult or risky.

One of the reasons these guys may resist or stall on requirements to move to dry storage may be that a lot of the fuel is not safe or easy to move. (FF-1)

Response: *The handling of fuel assemblies at OCNCS is regulated by NRC-approved procedures; fuel assemblies of various cladding designs can only be licensed for commercial nuclear plant use under 10 CFR Part 70, and the NRC has a certification process for spent fuel storage casks, regulated by 10 CFR Part 72. Because the nuclear fuel materials at OCNCS are continuously under licensing control, the NRC is confident that spent fuel can be safely moved from the spent fuel pool dry storage regardless of the specific type or location of fuel assembly. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.10 Comments Concerning Alternatives

Comment: I don't understand this thing with the cooling tower. The most efficient thing is a natural draft tower. I don't know why AmerGen asked the NRC to put in the mechanical draft, but why didn't the NRC say, "No. These are more efficient. Let's use them"? And what is the impact from them? Would they be less? (B-1)

Comment: The League supports the recommendation by the NJ Department of Environmental Protection that natural draft cooling towers should be installed at Oyster Creek. The NRC's acceptance of AmerGen's system using mechanical draft cooling towers, which consume more energy, is an incorrect response to an important problem. (YY-8)

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Response: *There are basically two ways to classify cooling-tower designs, either by the selected heat transfer mechanism (three types: wet, dry, or a wet-dry hybrid) or by the mechanism (two types: natural- or mechanical-draft) chosen to draw air through the cooling tower. Wet cooling towers transfer heat through evaporation, while dry cooling towers use nonevaporative heat transfer through convection. Both mechanisms accomplish temperature reduction of cooling water, with different trade-offs (e.g., energy penalty, visibility impact due to fogging, and aesthetic impacts resulting from views of the tower). Natural-draft tower designs are characteristically hyperbolic in shape and rely on the passive upward movement of air through the towers to provide cooling. Natural-draft towers are therefore quite large, generally up to 520 ft in height. Mechanical-draft towers rely on fans to move air upward through the towers and are generally less than 100 ft tall. In large power plant applications, mechanical-draft towers are multicelled systems, with fan-cells arranged in either linear or round configurations. Natural-draft towers are strictly “wet” cooling systems, while mechanical-draft towers can be “wet” or “dry” or in a variety of hybrid “wet-dry” combinations.*

The applicant considered a variety of alternative closed-looped cooling systems and proposed an alternative that would be economically feasible and minimize impacts on the environment while providing the lowest possible energy penalty. The applicant considered three basic types (wet, dry, or a wet-dry hybrid) of cooling towers and evaluated five design options that included both natural- and mechanical-draft towers. The design was chosen to accommodate site-specific constraints at the OCNGS site. The NRC evaluated the data supporting the applicant’s preferred option and concluded that the design includes control measures (e.g., drift eliminators) that mitigate adverse environmental impacts (e.g., fog or visibility impacts, drift deposition). The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: At the present time, to get the plant to work, they have to have cooling water in the condensers. That’s what they take out of the bay and put back in. In order to do that, the water comes out of the reactor at a temperature that they can’t return directly to the bay.

So they have a lot more water that they pump around and they do the loop and they put them together. They drop the temperature and put it back in the bay. If you have a cooling tower, you won’t need to do any of that. And the only thing you’ve got to make up is essentially the evaporation.

I quickly looked at a report. It says they would reduce the water usage 70 percent. It seemed to me they have reduced it 90 percent. I [don’t] understand where the 70 percent number comes from. So I think I’ve been given answers that really are not quite correct. (B-2)

Response: *The current circulating-water throughput is approximately 980,000 gpm. The evaluated closed-cycle tower design would require 260,000 gpm of dilution flow plus an intake design flow of 20,000 gpm. Approximately 10,000 gpm would be evaporated and 10,000 gpm*

would be discharged to the discharge canal as blowdown. The purpose of the dilution flow is to dilute the blowdown flow which would have high levels of total dissolved solids (high salinity) and elevated temperatures. The 280,000 total gpm throughput is therefore approximately 30 percent of the existing once-through system water requirement. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Can I make an official request that dry cooling be assessed as an alternative in the environmental impact to be considered? (O-2)

Comment: My case in point being the cooling towers, they stated that Oyster Creek had given them the cooling tower that they wanted, and they have not analyzed a dry cooling tower which would not require water to be taken from the environment, which I think is extremely significant. (O-4)

Comment: Another problem that I have is with the cooling towers. As I threw up before, they are only using in this study the cooling towers which is personally I feel is a worst case cooling tower for the plant because of the large quantities of water that would still be required to be pulled out of Barnegat Bay. There are other types of systems. There are systems that are dry that would not require any water to be taken out, and when these are included in an Environmental Impact Statement, they cooling towers would not be moderate. In fact, they would probably not even be small. They would probably be as small as they could possibly be. The effects of the tremendous amounts of water, and I'm not going to keep continuing here because obviously Mr. Gunter really covered this very well, but the effects of the tremendous quantity of water that is being pulled out of Barnegat Bay is devastating. (O-11)

Response: *A wide variety of cooling-tower types, designs, and configurations were considered for the OCNGS. The wet-dry hybrid design was chosen as most suitable for the site-specific constraints for Oyster Creek. Although providing for the least water consumption and eliminating entrainment and impingement losses, there are major disadvantages associated with a dry cooling tower for use at large nuclear power generating stations. Dry systems have the highest installation and operating costs and would impose the largest energy penalty of any of the cooling-tower designs that are currently available. Such tower designs impose load limitations on hottest days when power demand is greatest, and there is an increased likelihood of unit trips. The NRC staff determined that a dry cooling system would not be a reasonable alternative at the OCNGS site because of the very large size of such a system and space limitations at the OCNGS site. Information on dry cooling towers has been added to Section 8.1.1 of the SEIS. The text of the SEIS has been modified in response to these comments.*

Comment: And to what extent have those alternate plans really been evaluated by the Environmental Protection Agency as well as NRC? (F-6)

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Response: *The NRC staff is unable to determine what “alternate plans” the commenter is referring to. If it relates to alternative energy sources, the NRC’s analysis is presented in Section 8.3 of the SEIS. The NRC staff cannot comment on the extent to which the EPA has evaluated alternative energy sources for OCNGS. The comment provides no new and significant information; therefore, no change was made to the SEIS text.*

Comment: And, finally, one final point, which I'm really opposed to, is this giving someone an alternate remediation pathway. If you're impacting weakfish in Delaware Bay, as the Salem plant was, you don't go into a tidal marsh and try to remediate a tidal marsh, where weakfish don't hang out. Okay? And that stuff is nonsense.

These companies should be -- again, in this case, it bothers me. The companies, if you're using a natural resource, like seawater or an estuary, you should be addressing the effect that you're having on, directly on, the exact problem. Don't take it to some other habitat. And that is true in Barnegat Bay. There's nothing wrong with our tidal marshes in Barnegat Bay. We should be doing work in the bay itself, in the center of the bay. The communities are degraded out there.

I'm telling you, and I could write three books about this. Okay? And I'm letting you know I've done a lot of work out there. That bay is degraded. And we need to do something about it. And putting a fishing reef about three miles off or Barnegat Inlet is not the way to do it. Okay? It's not the way to do it. You put the funds in the Barnegat Bay, not into some reef three miles off the Barnegat Inlet. That does not have anything to do with the health of Barnegat Bay. (I-4)

Response: *The current Clean Water Act 316(b) Phase II regulations allow for remediation to offset losses associated with impingement and entrainment. It is up to the State of New Jersey, during its review of the applicant’s Phase II Comprehensive Demonstration Plan, to determine if remediation is appropriate for OCNGS. The NRC does not have the authority to prevent or require remediation or studies related to aquatic impacts on Barnegat Bay. The comment provides no new and significant information; therefore, no change was made to the SEIS text.*

Comment: Also, the moderate, estimated moderate, impact of the installation of a cooling tower system because of the assumption that saltwater would be used for that cooling water does not take into consider that perhaps the use of freshwater would reduce that impact. (A-5)

Comment: You said that the cooling tower requirements of 460 gallons per minute would possibly exceed what was available from the Oyster Creek and Forked River Creek and might have to be subsidized with groundwater...But we're using Barnegat Bay water now...So this same process is going to take the very same water and --...and use it, but not recycle it back in. You're just going to take it and evaporate it into the air....So you're going to be taking from the same source. (R-1)

Comment: If additional groundwater is needed, that would have a great impact on Lacey Township because any future development within our town required us to get a water allocation permit based upon how much groundwater is available. So it's quite obvious to us that the present system that is there now that has been working extremely well in the past would be certainly the one that we would favor the most.

We certainly wouldn't want to favor something that might possibly at some time in the future require taking groundwater because that is a commodity that, you know, there's just never enough of. I know we know down in the lower Cape May areas we're getting, you know, salt water coming into the groundwater systems, and we want to leave groundwater alone as much as possible. Let's affect the environment as easily as possible. (R-2)

Response: *Makeup water for the closed-cycle cooling system would be withdrawn from the intake canal. The design requirement for makeup water is 20,000 gpm, or more than 29 million gpd. This far exceeds the flow rates in the upper reaches of Oyster Creek and the South Branch of Forked River, and it far exceeds the pumping capacities of the two onsite wells. Pumping groundwater from a well field to meet the makeup water requirement would, over time, presumably cause significant saltwater intrusion into the freshwater aquifer, because the high withdrawal rate would result in a cone of depression that would extend far to the east and draw saline water into onshore aquifers. For this reason, the brackish water of Barnegat Bay that enters the intake canal is the only realistic source of makeup water. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: Alternatives, Description of the Closed-Cycle Cooling Alternatives (Pages 8-5 through 8-6). Would the excavation of piping have any effect on any of the existing groundwater monitoring network? (PP-12)

Response: *The potential configuration of the cooling towers and circulating water pipelines, as illustrated in Figure 8-1, is not expected to interfere with groundwater monitoring wells associated with the diesel remediation, the north parking lot, or the main transformer. Presumably any construction activities that would conflict with a monitoring well would result in construction of a replacement well at a nearby location. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Alternatives, Environmental Impacts of the Closed-Cycle Cooling Alternative, Terrestrial Ecology (Pages 8-6 through 8-21). During the planning of the proposed Forked River Nuclear Station in the 1970's, the EIS study was done for a different type of cooling tower (draft rather than linear hybrid model), different location and different release point/height. Therefore, the comparisons about salt deposition patterns described in Supplement 28 may be different and therefore produce different results. (PP-13)

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Response: *The discussion in Section 8.1 of the SEIS is based on the results of a new analysis of drift deposition rates from the proposed alternative hybrid cooling tower. The discussion was not based on the cooling-tower analysis in the FES. The new analysis demonstrated that "on average, at 2600 ft and beyond, salt deposition remained below 8.9 lb/ac/month, NRC's level of significance for visible leaf damage (NRC 1996)." The weather conditions producing maximum impacts were shown to be during the spring with winds off the Atlantic. Even under these conditions, surface salt deposition west of OCNCS would fall below the NRC level of significance at downwind distances between 4300 and 4600 ft. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Environmental Impacts of the Closed-Cycle Alternative, Land Use (Page 8-8)
We are not aware of any decision based on CAFRA that would preclude the construction of the cooling basin and towers. (PP-14)

Response: *The text in Section 8.1 of the SEIS has been revised to indicate that it is unclear if these restrictions limit the ability of the applicant to construct cooling towers on the OCNCS site.*

Comment: Summary of Environmental Impacts of a New Nuclear Facility Using Closed-Cycle Cooling at the OCNCS Site and at an Alternate Site (Tables 8-1 and 8-7). Environmental impacts of a new nuclear facility using closed-cycle cooling either at the OCNCS site or an alternative site in some cases are listed as SMALL to MODERATE or even MODERATE to LARGE in Table 8-7. Yet, environmental impacts of the current once-through cooling system and closed-cycle cooling alternatives in Table 8-1 both resulted in mostly SMALL impacts. Can you elaborate on the reasoning for choosing the MODERATE and MODERATE to LARGE impact ratings for a new nuclear facility with a cooling tower constructed on the OCNCS site? It seems that at least more of these impacts would be SMALL. (PP-15)

Response: *The construction of a new nuclear plant at a location other than the OCNCS site would involve substantial new land disturbance. Construction of a new nuclear plant at the OCNCS site would possibly require the acquisition of new lands because of the limited site area. Renewal at the OCNCS site would require no new land disturbance for construction. It is during the construction phase that most impacts are determined to be potentially MODERATE or LARGE. Continued operation would likely result in SMALL or SMALL to MODERATE impacts. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Page 8-7 and 8-9. In Table 8-1 a SMALL TO MODERATE rating is given for land use impacts associated with the modified existing once-through cooling system with restoration alternative. Likewise, in Table 8-, a SMALL to MODERATE rating is given for the historic and archeological resources category as follows: "Short-term adverse impacts to terrestrial resources would result from restoration activities and could range from SMALL to MODERATE,

depending on location and size of the site chosen. Long-term benefits to terrestrial resources from restoration are anticipated.” A potential "MODERATE" rating for both these categories seems overly conservative. The implementation of any restoration measures would inherently involve careful consideration by the Department of appropriate lands and a minimization of any negative effects to any affected species. A "MODERATE" rating seems to assume that these factors will not be considered. (PP-54)

Response: *Land disturbance would occur during restoration activities, and the location and size of the site have not been determined. It is true that mitigation measures are available to minimize some impacts, but the NRC cannot assume that those mitigation measures would be implemented in all cases. Therefore, a range of SMALL to MODERATE impact has been determined given the uncertainties in the location and the amount of disturbance associated with the restoration alternative. The inherent uncertainty associated with a major restoration alternative has some influence on the staff's assessment of impact. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Page 8-9. For the water use and quality category in Table 8-1, the Department has determined that it is premature and inappropriate to characterize all impacts on water use and quality as "small". As noted in the next statement, cooling tower blowdown would contain concentrated levels of chlorine and biocides that may not be used in the current once through system and may not necessarily result in an overall improvement in current surface water quality. However, the Department does agree that the implementation of cooling towers would result in a reduction of heat loading. To address this issue, this statement should be modified as follows: "Heat impact on surface water would be reduced from current level. Cooling-tower blowdown containing increased dissolved solids and intermittent low concentrations of biocides would be released; however, they would be diluted with the dilution-pump system." (PP-55)

Response: *The text in Table 8-1 of the SEIS has been modified in response to the comment.*

Comment: Page 8-10. In the socioeconomics category, there is no mention of benefits to tourism that may result from any restoration alternative. (PP-56)

Response: *The text in the SEIS has been changed to indicate that there may be additional economic activity resulting from tourism associated with restoration.*

Comment: Pages 8-24 – 8-25. What is the source of the information to support the below excerpt? The Department is unaware of any recent analyses of these technologies for the site-specifics of OCNCS. Any source or indication of whose conclusions these are should be included.

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"Other possible modifications to the system that might reduce impingement include utilizing a newer traveling screen design (e.g., a multidisc screen system), installation of an acoustic deterrent system for fish, and optimization of the existing fish-return system to reduce damage to fish. The effectiveness of these technologies or operational changes in reducing entrainment and impingement is uncertain. As stated above, none of these alternatives are expected to reduce losses by even 50 percent." (PP-60)

Response: *The referenced conclusion regarding the effectiveness of possible modifications to the OCNGS once-through cooling system was based on experience at other nuclear power plants and does not reflect a site-specific analysis for OCNGS. Such modifications have been employed at other facilities with varying success. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Page 8-8, Lines 2-6. The following statement appears, "Construction of the cooling towers at the OCNGS is under the jurisdiction of New Jersey's coastal management program within the NJDEP's Division of Land Use Regulation. Current restrictions under the requirements of the New Jersey Coastal Area Facility Renewal Act (CAFRA) limiting the percentage of impervious surface area for Lacey Township preclude the construction of the cooling basin and towers (AmerGen 2006)."

It appears the applicant (AmerGen) is referring to New Jersey's Coastal Zone Management Rules (Rules, N.J.A.C. 7:7E-1.0 et. seq.), specifically to the Subchapter 5 Rules with regard to impervious coverage at a proposed project site. The applicant is correct the proposed facility would require a Coastal Area Facility Review Act (CAFRA) Permit. However, the Division is not aware of any guidance given to the applicant as to whether Subchapter 5 Rules would "preclude the construction of the cooling basin and towers." In fact, the Division has met with the applicant to discuss placement of additional impervious coverage on the site at or in close proximity to the location the towers would be placed at. (See Figure 8-1) During the meeting, the Division provided guidance on a way to comply with impervious coverage rules.

Therefore, the Division requests the above cited statement; the statement in Table 8-1, Line 15; and any similar reference to Subchapter 5 impervious coverage rules be removed as not factual, unless there is documentation demonstrating the Division has previously advised the applicant that the percentage of impervious surface area would preclude the construction of the cooling basin and towers. If such documentation exists, then the Division reserves the right to review and comment on those document(s). (PP-68)

Response: *The text in Section 8.1 of the SEIS has been revised to indicate that these restrictions would not necessarily limit the ability of the applicant to construct cooling towers on the OCNGS site.*

Comment: Because the DEIS fails to properly assess baseline conditions prior to construction of the Facility, the No Action Alternative is inadequately portrayed and analyzed. If the adverse impacts caused by the Facility were properly analyzed, and then compared to a proper assessment of the No Action Alternative, there would be no way to avoid the conclusion that operating the Facility harms, and will continue to harm, the environment. (MM-2)

Response: *Under NEPA, the “no-action” alternative is not taking the action that is before the Federal action agency. In this case, the no-action alternative evaluated in the SEIS is essentially denial of license renewal and cessation of operations. This review is for renewal of the license, not construction of the facility. Impacts related to denial of the renewal are evaluated in Section 8.2. The original impacts of construction were considered in the 1974 FES for the facility. The staff has always maintained that continued operation of OCNGS would have some environmental impact as does any of the alternatives. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: A troubling trend with respect to the Facility has been to ignore the negative impacts the Facility has on the Bay and the area immediately surrounding the Facility, and focus on restoring other areas. This concept was proposed by the NJDEP in the draft NJPDES permit, and NRC (as well as AmerGen) has gravitated to this option because it essentially allows AmerGen to continue to operate with impunity and externalize what should arguably be internalized by the Facility. Not only is this option problematic from the standpoint that it allows AmerGen to maintain the status quo, it suggests that regulators are reading out of the Clean Water Act the requirement that facility's using cooling water intake structures reduce impingement and entrainment impacts by implementing performance standards. In fact, EPA's efforts to downplay this requirement in the Phase I rules (with respect to new facilities) and allow for restoration in lieu of operational changes was challenged in court and that provision was ruled to be in violation of the Clean Water Act. A similar challenge was brought against an identical provision in the Phase II rules, and the Second Circuit is likely to find that the provision of the Phase II rules also violates the CWA.

In the case of the DEIS, NRC has considered as one of the alternatives that the Facility would continue to operate using its antiquated once through cooling water intake system, "modified" by restoration efforts. DEIS Section 8.1.2. This approach is not only misguided for the reasons stated in the preceding paragraph (and more fully explained in the attached NJPDES comment letter and letter to the NJDEP), but also because it is based on a flawed or incomplete understanding of the Bay. First, for the reasons set out earlier in this comment letter, the status of Bay populations is unknown. Until that information is obtained, there can be no way to know what type of remedial or restorative measures should be undertaken to offset impingement and entrainment losses, assuming for purposes of argument that such an effect can be achieved in the first instance.

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The DEIS essentially assumes that coastal wetlands should be restored in an effort to offset the impingement and entrainment losses, but that assumption appears to be based on generalized information about the loss of coastal wetlands, and not connected in any way to actually restoring habitat that fosters the types of species adversely affected by the Facility. On page 2-3 1 of the DEIS, NRC cites to a study by Hartig and Gornitz in support of its conclusions about the loss of coastal wetlands. This study relates to Jamaica Bay, which is a completely different system. It is inappropriate to use this study to extrapolate both positive and negative benefits associated with restoration.

The general loss of salt marsh along the eastern seaboard is due to sea level rise exceeding the rate of sediment and organic matter accumulation or accretion on the salt marsh surface. The sea level rise is most likely related to global warming trends. This is a problem that poses a long-term threat to most salt marsh systems. Some systems are maintaining their position, however, because of rapid accretion. The loss of salt marsh in the Barnegat Bay-Little Egg Harbor system appears to be relatively minimal over the past 30 years since the federal government, and later the State government, began protecting wetlands.

Contrary to the suggestion in Section 2 of the DEIS, every bay and its associated wetlands areas are different. It is inappropriate to compare Jamaica Bay to the Barnegat Bay - Little Egg Harbor system. Development and other human activities around Jamaica Bay have been dramatic, even relatively recently, which is an important point of differentiation between the two systems. Some bays are surrounded by submerging shorelines related to excess removal of groundwater or oil and gas (for example Galveston Bay in Texas), while others are emerging due to isostatic rebound over the past 10,000 years in response to melting of continental glaciers from the last major glacial period (bays and shorelines in the northeastern part of the country). (MM-10)

Comment: The Phase II rule has been challenged and is in any event inapplicable to the NJDEP permit decision. See the attached NJPDES comment letter for the ramifications on NRC's conclusions. (MM-71)

Response: *Under the current Clean Water Act 316(b) Phase II regulations, restoration is considered appropriate mitigation, and the NRC staff cannot base its assessment on speculation as to what the courts might do in regard to the court challenges to the regulations. Contrary to the assertions in the comment, the NRC does not favor one alternative (e.g., restoration) over the other. The assessment presented in Section 8.1 weighs the relative impacts of each alternative on the basis of information available to the NRC staff. The staff agree with the commenter that the current status of many ecological resources in Barnegat Bay are poorly understood and has revised the presentation of impacts on aquatic resources to reflect the uncertainty associated with this lack of current information. It is up to the State of New Jersey to determine, after a review of the applicant's Phase II Comprehensive Demonstration Plan, if restoration is appropriate for OCNBS. The comments provide no new*

and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: In the case of the Facility, the emphasis should be on aquatic habitats and communities right in the Bay itself for remediation. This has not been done in the DEIS, and cannot be done, because there is a dearth of information to even allow an effective restoration program to be developed. Until the necessary information exists to design the restoration rationally and then assess the impacts of this "alternative," it cannot be properly analyzed and considered as such. (MM-12)

Comment: It is incorrect to say that a modified one-through cooling water system with mitigation restoration would lessen the impact. This can only be determined once the restoration plan is in place. Mindless restoration of tidal marshes will not do anything to mitigation the adverse impacts the Facility is having on certain populations of fish. (MM-72)

Comment: NJDEP has not finalized the NJPDES permit. Restoration is not technology and it is not a viable alternative. In addition, the analysis of the impacts of the modified once-through cooling system is subject to all the same criticisms. NRC cannot conclude that restoring wetlands will have long term benefits to the Bay unless it knows what it is trying to accomplish and how that can be done. (MM-73)

Response: *The NRC staff agrees that the impacts (including benefits) of restoration cannot be understood without a better understanding of the nature and location of restoration activities. The impact categories assigned to this alternative reflect that uncertainty. Restoration is a mitigation strategy that is allowed under the Clean Water Act's 316(b) Phase II regulations. It is up to the State of New Jersey to determine if restoration is a viable option to mitigate intake-structure-related impacts. The comments provide no new and significant information; therefore, no change was made to the SEIS text in response to these comments.*

Comment: 2.1.3 Cooling-and Auxiliary-Water Systems. This section of the DEIS appears to be based in large measure on the draft NJPDES permit issued for comment by the NJDEP. As such, NRC should consider the attached comments to the draft permit. It appears NRC used the draft permit as the basis for determining the scope of alternatives to be considered the DEIS. (MM-14)

Response: *The draft NJPDES permit was used in the SEIS because it represents important new information pertinent to operations of OCNCS. The resulting final permit will set operating standards for at least a portion of the license renewal period. Because the NRC cannot presume the outcome of that ongoing permitting process, the NRC staff used information in the draft permit to determine the most likely outcome, and evaluated alternatives to the existing once-through cooling system that were identified in that draft permit. The comment provides no*

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new and significant information; therefore, no change was made to the SEIS in response to this comment.

Comment: All of the adverse affects over the past 40 years will continue for the period of relicensing. The ecosystem may rebound if the Facility is not relicensed. After admitting that the construction of the intake and discharge canals destroyed the ecosystem, how can NRC conclude (8-35) that the cessation of those impacts will be small? (MM-74)

Response: *The impacts of the no-action alternative are described in Section 8.2 of the SEIS. The construction and operation of OCNGS has altered the ecosystems in the lower portions of both Oyster Creek and Forked River as well as created new aquatic habitat in the intake and discharge canals. Over time, these altered environments have reached equilibrium and now provide suitable habitat for a variety of species. Permanent cessation of OCNGS operations could result in destruction or alteration of these existing habitats and lead to a degradation of the current environment in the lower portions of both Oyster Creek and Forked River because of the accompanying changes in flow rate, salinity, and temperature. The current high levels of shoreline development could contribute to poor water quality in the lower portions of these streams once the flushing nature of the station flow is eliminated. The comment provides no new and significant information; therefore, no change was made to the SEIS text in response to this comment.*

Comment: NRC should consider EPA's responses to concerns about salt, icing and fogging at the Brayton Point facility in Massachusetts when determining the impacts associated with cooling towers (see attached NJPDES comment letter). Did NRC consult with EPA on the assessment of the alternatives? Or is NRC relying on information supplied by the applicant? (MM-75)

Response: *In preparing the air quality evaluation presented in Section 8.1 of the SEIS, the NRC evaluated information (including screening model results) developed by the applicant. The applicant used an approved modeling approach and the results were reviewed by the NRC staff for reasonableness. These results are considered conservative, that is, they likely overestimate rather than underestimate salt deposition rates.*

The NRC staff did not consult with the EPA on our assessment of alternatives, but did consider the EPA's responses to comments on the Brayton Point Station NJPDES permit. With regard to the issue raised on salt deposition and icing and fogging at Brayton, the NRC agrees with the EPA's response to public comment that "there are several alternative methods that could be used, alone or in combination, to adequately deal with any threat from fog or ice and that would not require, or at least would greatly reduce, any generating unit shutdowns. Such methods evaluated by EPA include, for example, plume abatement cooling towers, enhanced traffic safety programs, and equipping cooling towers for occasional bypassing." It should also be noted for the proposed mechanical-draft wet towers at Brayton, that the EPA stated that the

agency "does not believe that the visible plume or any fogging from the cooling towers should be regarded as imposing an unacceptable adverse visual/aesthetic impact. In any event, the permittee would be required to satisfy all applicable air emission standards." Icing, fogging, and salt deposition from the proposed linear hybrid mechanical-draft cooling system at OCNGS is expected to be much less than that from the proposed mechanical-draft tower at the Brayton Point station.

The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Section 8 – Alternatives. The above comments also apply to this section. [Note: In this comment, the NJDEP is referring to their comments on aquatic ecology, human health, and socioeconomic portions of the SEIS.] (QQ-12)

Response: *The comment is not specific enough for the staff to respond. Nevertheless, see responses to other comments from the NJDEP (Comment identifier QQ) on aquatic ecology, human health, and socioeconomics. Changes were made to the SEIS in response to the NJDEP comments on the individual issues. This comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The Draft GEIS reaches the untenable and unsupportable conclusion that the alternative of closed cycle cooling would have MODERATE environmental impacts—a greater degree of harm than found for the present operation of OCNGS. Closed-cycle cooling would drastically reduce the amount of water (and species) withdrawn from Forked River by OCNGS. A closed-cycled cooling system would reduce the amount of water withdrawn by the OCNGS by as much as 96% [EPA, Phase II Rule Technical Development Document, at 4-1 (available at www.epa.gov/waterscience/316b/devdoc/ch4.pdf)]. The mortality of species entrained by OCNGS would be reduced by approximately that same percentage. By way of example, where certain once-through cooling systems entrain 3.65 million organisms per year, replacing that system with a closed-cycle cooling system would reduce the number of organisms entrained to as low as 180,000 organisms [Riverkeeper, Inc. v. U.S. Env'tl. Protection Agency, 358 F.3d 174, 195 fn. 22 (2d Cir. 2004)]. This dramatic reduction does not even account for the number of organisms spared from thermal shock, impingement, and polluted discharge by the closed-cycle cooling system. One study has found that the conversion from a once-through cooling system to a closed-cycle cooling system reduced fish impingement by over 95% [Benda, Robert S., et al., Comparison of Fish Impingement at the Palisades Nuclear Power Plant for Once-Through and Closed Cycle Cooling, Indiana Academy of Science (Vol. 85, 1975)]. (GG-20)

Comment: Moreover, Section 316(b) of the federal Clean Water Act requires that the "location, design, construction, and capacity of cooling water intake *structures* reflect the *best technology available for minimizing adverse environmental impact.*" [CWA § 316(b), 33 U.S.C. § 1326(b) (emphasis added)]. It is well established that closed-cycle cooling is the "best" technology,

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because, as the NJDEP has recognized, it is "the only cooling water intake structure technology available to [OCNGS] to reduce entrainment." [NJDEP Fact Sheet on Proposed Permit for OCNGS, p. 12]. Closed-cycle cooling is certainly "available," since 73 power plants have implemented this technology by converting from once-through to closed-cycle systems [EPA, Phase II Rule Technical Development Document, Chapt. 4 (available at www.epa.gov/waterscience/316b/devdoc/ch4.pdf)].

This portion of the Draft GEIS, however, appears to be primarily based on an analysis conducted by URS Corporation for AmerGen, the plant operator, to demonstrate that conversion of OCNGS to a closed-cycle cooling system is "unavailable" technology for the OCNGS. The opening paragraph of the AmerGen document states, "This report was written with the intended audience being the permit writer [NJDEP] and is not intended as a detailed design engineering report." The analysis was not peer-reviewed, does not include all the available alternatives for cooling tower options, and is an obvious attempt to allow OCNGS to maintain its current once-through cooling system. Some of the environmental and water quality issues with cooling towers raised in the AmerGen report, and subsequently restated in the Draft GEIS, have been substantially overestimated when compared with analyses conducted by other agencies and consulting firms, including plume formation, salt-drift, and discharge water quality. [Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005], [Evaluation of Cooling System Alternatives Proposed Morro Bay Power Plant, Produced by Tetra Tech for the San Luis Obispo Regional Water Quality Control Board, May 2002], [EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects]. The Draft GEIS fails to consider available technologies that would satisfactorily address and/or essentially eliminate all three (3) of these concerns. In addition, the NRC did not fully explore all of the available alternatives to once-through cooling, nor did they question the analyses performed by AmerGen on the five other closed-cycle cooling systems they investigated. There are significant problems with AmerGen's arguments/issues used to eliminate other available cooling tower options that would have less of an impact on the environment, such as dry cooling towers. (GG-21)

Response: *The moderate impact level assigned to the closed-cycle cooling alternative was related to the anticipated exceedance of air quality standards resulting from salt drift from towers. The NRC staff agrees that the conversion to closed-cycle cooling would result in significant reductions in the numbers of organisms that are impinged and entrained and that thermal loading to Barnegat Bay would be significantly reduced.*

The staff did not rely solely on the URS Corporation document; a variety of other sources were used for the staff's assessment. The nature of the staff's review is consistent with what is expected for the evaluation of an alternative. The applicant's proposed alternative and their assessment appeared to be reasonable.

The proposed hybrid cooling-tower system takes advantage of some of the strengths and minimizes some of the weaknesses associated with an all dry or an all wet cooling-tower design (mechanical- or natural-draft). For example, a dry cooling system would be cost-prohibitive for the Oyster Creek power plant considering its size, age, and design. Furthermore, the site is not sufficiently large to accommodate a dry cooling system. In addition, such a system would impose a large energy penalty, approximately twice the 32 MW(e) associated with the proposed hybrid system. The proposed hybrid system design would also eliminate or significantly reduce the visible plume associated with a wet tower. The text of the SEIS has been modified in response to this comment.

Comment: One of the most important and unsubstantiated conclusions put-forth by AmerGen and accepted by NRC, is the statement that the use of a hybrid wet-dry cooling tower (AmerGen's preferred cooling tower option) would result in a MODERATE impact to air quality from salt emissions. Such conclusions have been perpetuated by many different power plants attempting to circumvent the EPA Phase I and II requirements, and emphatically rejected by the EPA and other regulatory agencies. The issue of salt drift from power plants utilizing saltwater has been shown in theory and practice to be of small significance and if necessary, is easily mitigated [EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects]. In addition, according to the EPA, "[m]odern cooling towers utilize advanced fill materials that have been developed to minimize salt or mineral drift effects. The Agency estimates that the typical plant installing a cooling tower as a result of the requirements of this rule will equip the tower with modern splash fill materials [Id]." The Draft GEIS must evaluate such salt-mitigation technologies if it is to take a "hard look" at the available alternatives. (GG-22)

Response: *In Section 8.1 of the SEIS, it is stated that estimated or potential PM_{10} emissions from evaporated water containing total suspended and total dissolved solids, including salts, associated with the proposed hybrid tower design would exceed 250 tons per year. This level of emissions would be consistent with the EPA's definition of a major source under current Prevention of Significant Deterioration (PSD) regulations. The SEIS indicates that a first cut conservative screening estimate of air quality impacts associated with the proposed hybrid tower design would exceed the National Ambient Air Quality Standards (NAAQS). To obtain a PSD permit, the applicant would need to submit a permit application to the NJDEP. The application would need to demonstrate compliance with NAAQS for PM_{10} and the associated PSD increment using a detailed air quality modeling analysis with an EPA-approved "guideline" model. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Another important alternative that was not evaluated in the Draft GEIS nor by AmerGen was the use of wastewater from the Central Water Pollution Control Facility (current provider of wastewater treatment for the plant) as the source water for the cooling towers. The substantial reduction in water usage of cooling towers makes the utilization of wastewater a

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viable alternative. The reuse of the discharge from this facility would not only eliminate issues related to using saltwater, but would also provide an additional environmental benefit of eliminating or reducing the ocean discharge from the wastewater facility. The use of wastewater in cooling towers is not uncommon, especially in the western part of the country where water is an expensive commodity. For instance, the California Energy Commission has determined that "(w)astewater rather than seawater may be treated appropriately and used for feed-water to a cooling tower. Treated wastewater is less corrosive than ocean water so cooling tower construction materials may be less costly than is the case with salt water [Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005]" (GG-23)

Response: *The viability of using sanitary wastewater to meet the 20,000-gpm design requirement for makeup water would depend on the availability and capacity of municipal wastewater treatment facilities. The two wastewater treatment facilities in the vicinity of OCNCS are the Central Water Pollution Control Facility (CWPCF), located about 7 mi north of OCNCS in Berkeley Township and the Southern Water Pollution Control Facility (SWPCF), located in Stafford Township, about 5 mi south of OCNCS. The CWPCF has a capacity for treating 28 million gpd (19,400 gpm) of wastewater. Although this capacity approximates the design requirement for makeup water, it represents the maximum flow that can be treated at the facility. The actual flow rate (and availability of water for cooling) would vary, but generally be less than 19,400 gpm. The SWPCF has a capacity of 20 million gpd (13,900 gpm). Relying on treated wastewater for use as makeup water would likely require access to both the CWPCF and SWPCF to ensure adequate supply, and would require modification to existing infrastructure, including the construction of pipelines to transport water from the treatment plants to OCNCS. Although the use of municipal wastewater for cooling at OCNCS could be technically feasible, the NRC cannot impose implementation of any specific system on the licensee. As long as the applicant possesses a valid State of New Jersey NJPDES permit that allows the licensee access to cooling water from Barnegat Bay, it is unlikely that alternative sources of water would be seriously considered. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: The discussion about the applicant's alternative closed loop cooling system was shallow because it failed to link any air pollution emissions with cooling water quality. (CC-5)

Response: *Emissions were estimated on the basis of total suspended and total dissolved solids in the recirculating and makeup water streams. This includes consideration of the optimal usage of chemicals (e.g., dechlorinators, pure acrylic acid with no phosphates or phosphonates and acrylic acid co-polymer, and sodium hypochlorite) for corrosion and scaling control and control of biological fouling. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: In the draft NPDES permit, the NJDEP identified that the preferred alternative for compliance with the 316 (b) rules is a cooling tower. Several cooling tower designs were discussed in the draft SEIS with a linear hybrid mechanical draft design selected as the optimal one for OCNCS. The draft SEIS states that there would be impacts to air quality, predominantly particulate matter in the form of salt, from the operation of a cooling tower. (HH-9)

Comment: With this in mind, we support and strongly recommend the selection of a cooling tower as the mitigation measure used to comply with Section 316(b). Such a system would reduce the water use from the Forked River by 70 percent and have a corresponding reduction of entrainment and impingement of aquatic life thereby achieving the 80-95% reduction goals of the regulation. The impacts from thermal discharges and heat shock would also be substantially reduced. Given these benefits to the aquatic ecosystem and the limited effects to air quality, a cooling tower with appropriate air pollution control would be environmentally preferable. (HH-11)

Response: *In the SEIS, the NRC staff did not select the linear hybrid mechanical-draft tower as the optimal one for OCNCS. The design was proposed by the applicant in AmerGen (2006). Section 8.1 of the SEIS evaluated the impacts of a linear hybrid mechanical-draft cooling-tower system, and determined that such a system would result in substantially lower impacts to aquatic resources relative to those resulting from operation of the existing once-through cooling system. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: We agree with the draft SEIS that the appropriate control of the PM₁₀ emissions would be a drift eliminator which is considered the Best Available Control Technology (BACT). However, we are very concerned that the draft SEIS states that even with the optimal drift eliminator efficiency the predicted downwind PM₁₀ concentrations would still exceed the ambient air quality standard and the Prevention of Significant Deterioration (PSD) class II increment. With the exception of indicating which model was used, the draft SEIS did not discuss how this conclusion was reached and therefore, we ask that NRC provide to us the information and assumptions that were used for the model, before the release of the final SEIS. We can offer technical assistance to NRC and the applicant to evaluate and further reduce these effects. Nonetheless, we believe that these impacts can be managed. (HH-10)

Response: *Section 8.1 of the SEIS evaluated the impacts of a linear hybrid mechanical-draft cooling-tower system and determined that such a system would result in substantially lower impacts on aquatic resources. The NRC staff relied on the applicant's modeling effort to predict downwind PM₁₀ concentrations (AmerGen 2006). The NRC staff's review involved a determination of the reasonableness of the approach and findings. On the basis of that review, the predicted downwind concentrations appeared reasonable. This review is preliminary and additional modeling would be performed based on final project design. The comment provides*

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no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: What is the basis for NRC's assumption that New Jersey will need to replace the Facility's power generation? (MM-76)

Response: *The NRC does not presume that New Jersey will need to replace OCNCS power generation capacity. Rather, the NRC evaluates the impacts of replacing that capacity. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: I would recommend wind, solar, tidal, and conservation as a specific combination group, excluding all fossil fuels. (O-1)

Comment: They did not include as alternatives a combination of non-fossil fuels, very specifically tidal, wind, solar, which could be included with conservation which would have a dramatically different effect on their conclusions. (O-5)

Comment: I understand that you considered primarily natural gas and curtailed usage for replacement power, but I heard some people call tonight to look at solar, wind, and things like that more and to study that, and I'd like to ask you if you are going to take a look at those things, I would like to ask you to consider certain other factors. Number one, solar doesn't work well at night, and the wind doesn't always blow. Oyster Creek is a base load plant. It provides power all the time. (S-1)

Comment: I would like to see the NRC consider in their impact statement the combination of alternate fuels or alternate energy sources, that being the combination of natural gas, solar power, wind power, and conservation.

I think that if the area of conservation were given to people in the sense of a bonus, an energy bonus, for example, if people were seen as being cooperative with lowering their bills voluntarily, then maybe instead of penalizing people or not giving them any type of reinforcement for that, you could give them a bonus, like five bucks a month or two bucks or whatever it may work out to be, kind of like when you spend on your Discover card. You get a bonus back. So I think that to just have negative ideas about the fact that we can't conserve, I think that when we as a nation come together like we did post 9/11 with the little flags and everybody getting together in support of each other in this great country of ours, I think that conservation may be more positive as one of the combination alternates as you can get. (BB-2)

Response: *In determining the specific combination of alternatives for evaluation in the draft SEIS, the NRC staff chose a combination of natural gas plant generation, demand-side management (DSM), and purchased power. This combination was chosen because it could*

replace OCNCS's baseload capacity and could be implemented with existing technology. The combination of alternatives could be derived a number of ways as discussed in Section 8.3.6 of the SEIS. Natural gas was determined to have the least environmental impact of the baseload technologies and was consequently chosen to supply the larger portion of the power needs in the combination of alternatives. Purchased power was chosen over solar or wind or other renewables because of the reduced environmental impacts of that choice. New solar and new wind projects would have environmental impacts during construction of those facilities. Purchased power could conceivably include the purchase of renewable energy from existing wind, solar, or hydropower plants, not only eliminating the impacts from construction of new power sources, but also eliminating some of the air quality impacts from existing coal or natural gas plants. Since impacts associated with the generation of power available for purchase are already occurring, no impacts associated with purchased power are added to the tabular summary of impacts for a combination of alternatives. DSM is evaluated in the combination of alternatives. A discussion of the DSM program in New Jersey and the conservation measures that it includes is provided in Section 8.3.5.11.

In general, the comments express a desire for the NRC to also consider a combination that includes all renewable energy sources. The NRC staff has revised Section 8.3.5 and 8.3.6 to include such an assessment. Consideration of tidal energy as a component of a combination of alternatives was specifically requested by several commenters. Existing tidal energy systems rely on dams across tidal streams or basins to store and release water for power generation. A discussion of tidal energy systems has been added to Section 8.3.5.12 of the SEIS. The NRC staff considers the feasibility of developing a tidal system in the region to be low because of the associated environmental impacts of construction and operation and the limited tidal range (generally less than 1 ft) in Barnegat Bay. Newer technologies that do not require dams may have less impact, but have other limitations such as maintenance of minimum water depths, especially in navigable waters, that make them impractical in the region. The text of the SEIS has been modified in response to this comment.

Comment: I'd also like you to consider, if you would be willing to do that, when you look at replacement sources for Oyster Creek that you evaluate the costs associated with that replacement. For example, oil is at an all-time high. Gas and coal can be extremely expensive compared to nuclear, and if people can't afford to use it, then it's not going to be a replacement power. I think we also need to look at the availability and the use of foreign oil and where those prices are at record high and where they're likely to go in the future as you look at this to keep a balance. And I'd just like to ask you if you are going to go back and reconsider it, would you please consider also some of those things. (S-2)

Response: *The Commission determined that an applicant for license renewal need not provide an analysis of the economic costs or economic benefits of the proposed or alternative actions. The NRC makes its decision whether or not to renew the license based on safety and environmental considerations. The final decision on whether or not to continue operating the*

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nuclear plant will be made by the utility, State, and Federal (non-NRC) decision makers. This final decision will be based on economics (as suggested in the comment), energy reliability goals, and other objectives over which the other entities may have jurisdiction. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Comment: Another thing, I am at a loss to understand how the substitution of such passive energy sources as wind or solar power could have a moderate or large effect as compared to the small effect of the plant. I mean, common sense tells you that perhaps there would be some initial disruption of the environment in the building of these energy sources, but ultimately it is bound to have a small. Sure, if you're going to compare it with an unclean coal plant, I mean, your worst possible case, just like the cooling towers are the outdated type of cooling power for a nuclear plant. They should be natural draft and not mechanical or forced draft. I mean, if you're going to compare things like that, that is unforgivable in my opinion. (D-5)

Response: *The environmental impacts of alternatives to license renewal, including renewable sources, are greater than continued operation of OCNGS because construction of these new sources of energy create the most environmental damage, and this construction would have to occur to replace the baseload capacity of OCNGS. Many of the alternative energy sources would require large land areas that are presumably not now disturbed. The construction and future dedication of that land area to energy production, even a "green" energy source, would remove or alter resources for extended time periods. The impacts at OCNGS from construction have already occurred, and no further loss would be experienced. Many of the alternatives do have SMALL operational impacts, as pointed out in the various tables provided in Chapter 8. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: I have actually residents coming out and asking why aren't we building a standardized reactor behind Oyster Creek, (W-3)

Comment: In closing, you are charged with the decision of renewal for a 20 year period by statute. Just perhaps in the ensuing years more compact, modern design Nuclear Reactors, which are being worked on as we speak here today, maybe the new transition for plants as Oyster Creek as they can shift over to new reactor technology much sooner than 20 years and the industry itself will upgrade prior to the expiration of the licensing period. Electric Power is precious to us all! We need every megawatt we can generate safely, without sending CO₂ into the atmosphere! (LL-5)

Comment: If the nuclear plant is deemed necessary for power, then a new plant as planned in the 70's, should replace the current obsolete plant with one in the new safer design. (XX-6)

Response: *These comments address a new nuclear alternative. The impacts of building a new nuclear reactor are evaluated in Section 8.3.3 of the SEIS. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: Oyster Creek produced zero carbon emissions and avoided 7.5 million metric tons of carbon dioxide that replacement power would have produced. Oyster Creek avoids carbon emissions equal to more than two million cars per year, or to put it differently, an amount equal to half of all the motor vehicles in New Jersey. (M-4; S-6)

Response: *Nuclear power contributes substantially fewer CO₂ emissions to the atmosphere than fossil-fuel-based energy production methods. Although the amount of CO₂ emissions is not zero, the uranium fuel cycle, onsite internal combustion engines, and commuting exhausts produced by station workers are just some of the sources of CO₂ from the OCNCS. CO₂ emissions from various sources of energy are discussed in Section 8.3 of the SEIS. The comment provides no new information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: And I just want to thank the NRC, too, for taking into consideration the different factors for alternate power sources because we all recognize who work in the industry that Oyster Creek is a base load plant. So I do favor renewable energies, but I think we need to keep them in the perspective that they belong in as that they are a complement to a base load plant. (W-1)

Comment: As far as looking at alternative sources, I think the age we're living in is very interesting to see these changes that we see in our environment in the last five years that I recognized as far as global warming, the quality of our air and the need to lessen our dependency on foreign oil.

We live in a dynamic society where our environment is changing constantly. Our population is increasing. Our cars, the amount of vehicles we have on the road in New Jersey is five million cars. The fellow that was talking about conservation, we have luxury military vehicles that are on the road, the Humvee. I mean, does that make sense to you? It doesn't make sense to me. But when you talk about conservation, people have all different kinds of ideas about conservation, and the reality is you have your idea of conservation and the fellow that owns the Humvee has his idea of conservation, as far as his idea. (W-2)

Comment: We always end up returning to what are we going to do with the spent fuel, and I see the different alternatives that are out there right now, and again, it is encouraging to see that we're working with other countries. We're looking to recycle fuel possibly. We're looking to start up reactors that actually produce hydrogen, maybe to supply the gas, to supply cars for hydrogen fuel cells. I mean, wouldn't that be a great thing? (W-4)

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Comment: But I have to tell you from '69 to date and moving forward, I truly believe that we have had a minimal effect on the environment. Now, if you want to compare that to a coal plant that we had there, I watched a little clip on HBO Sports with Bryant Gumbel and he was interviewing certain people in different towns that house these coal plants, and the companies were actually buying up some of the towns and destroying their homes because the people couldn't live in the towns anymore. The kids in the park couldn't play in the parks anymore because of all of the respiratory diseases. (W-5)

Comment: I myself think that because of the current research and ongoing research into the uses of coal as a source of power, of which the United States has a proven reserve of over 300 years, we could substitute that for the fuel used at Oyster Creek and we would be free of that worry of a nuclear catastrophe. (X-3)

Comment: I think the gentleman who talked about coal being a viable source made an excellent point. There are better scrubbers available now, and that's a technology that has much room for improvement. There are ways to deal with the fumes from coal in a way where there's absolutely no potential of completely destroying the entire economy of the country, (Y-1)

Comment: We're doing solar and wind projects every day of the week. We're doing energy conservation projects. If nuclear had anything resembling the obstacles that a wind project has, you could never get a nuclear plant in. Okay?

We have to go through incredible bureaucratic hassles to get a permit. I know because I put in a significant portion of the wind generators on shore in the last five years. It's very, very difficult to get a permit to put in a wind generator at your house.

The obstacles that the NRC is faced with are nothing compared to that, and the potential hassles and problems associated with nuclear plants are magnitudes larger than what's associated with wind. Between zoning and everything else, it's not that easy to get a wind project in.

You know, I've heard Congressmen and everybody else say, "And wind is going to do the trick." Well, it's not because you can't even get a permit. Okay? (Y-4)

Comment: I think that coal is a lot safer. (Y-6)

Comment: Excluding all of New Jersey's potential for clean energy and energy efficiency programs, a PJM regional electricity grid assessment of transmission requirements to the New Jersey Board of Public Utilities (NJBPU) shows that Oyster Creek's retirement by the end of its current operating license in 2009 will require one transmission line upgrade. (PJM Report, attached). The PJM assessment also shows that if Oyster Creek retires in combination with the expected retirement of other aging coal plants, the solution is likely new transmission lines or

transmission line upgrades. However, with proper planning, the electricity generated by Oyster Creek, 1.7% of the electricity consumed on the PJM Mid-Atlantic regional electricity grid, can easily be replaced through a combination of proper use of efficiency and conservation measures, as well as clean, safe, renewable power like wind and solar. (MM-77)

Comment: New Jersey just adopted one of the strongest clean energy standards in the country, ensuring that 20 percent of electricity consumed in the state comes from clean sources, primarily wind and solar, by 2020. In addition, Governor Corzine also has a goal of reducing energy consumption by 20 percent by 2020. (MM-79)

Comment: There is too much risk associated with a nuclear plant so close to so many people. There is time, if you get moving, to switch over to wind turbine power and solar power before the current license expires. (RR-1)

Comment: So much technology for safer cleaner energy alternatives are now available and during the next 5 years more will be, just think what a dinosaur this plant will be by 2031 if it gets relicensed. (TT-2)

Response: *The above general comments lack specificity but address alternative energy sources. The impacts of these alternatives are discussed in Section 8.3 of the SEIS. The comments do not provide new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: Last week I wrote you a letter asking you NOT to relicense the 35 year old (New Jersey) Oyster Creek Nuclear Plant. So much change for clean safe energy has been made since this plant was built and so much more will be available in the near future. Such as the article enclosed of a company named Geoplasma in Atlanta building a plant in Florida to vaporize trash. Synthetic, combustible gas produced will be used to run turbines to create electricity. Sludge from waste water will be hardened into slag for road construction. *Please read* the attached article. (UU-1)

Response: *The impacts of using municipal solid waste to generate electricity as an alternative to OCNCS generation is addressed in Section 8.3.5.7 of the SEIS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.11 Comments Concerning Editorial Issues

Comment: Page Number 2-8, Line Number 13-14. What it is in DEIS: The low-flow axial pump design allows for some impingement and entrainment survivability. What it should be changed to: The low head axial pump design allows for some impingement and entrainment survivability. Why: The dilution pumps are of a high flow design. (II-1)

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Response: *The text in Section 2.1.3 has been revised as suggested.*

Comment: Section 2.1.7 in the draft report, I think it's titled "Power Transmission System." That entire section, I read through it. And it's silent with respect to the Oyster Creek Nuclear Generating Station output power transformers, does not indicate their location, the ownership, and the responsibility of those transformers. (A-3)

Comment: Section 2.1.7—Power Transmission System is silent with respect to the Oyster Creek Nuclear Generating Station output power transformer(s).....Location, ownership, responsibility, secondary containment? (CC-3)

Response: *The text in Section 2.1.7 has been revised to provide the requested information.*

Comment: Page 2-28. The following statement seems to make an erroneous reference as Warren County does not border Philadelphia. "To the northwest, Warren County (~~bordering Philadelphia~~) is designated as a sulfur dioxide nonattainment area." (PP-29)

Response: *The text in Section 2.2.4 has been changed in response to the comment.*

Comment: Page 2-20. The following additions will serve to clarify the appropriate regulations: "A provision of the CWA and NJPDES regulations allows facilities to continue to operate under an expired permit provided that the permittee makes a timely renewal application, which is the case with OCNGS.

In July 2004, the EPA issued Phase II regulations for existing electric-generating plants that meet eligibility criteria as set forth at 40 CFR 125.91 including a total design intake flow of 50 MGD or more." (PP-27)

Response: *Section 2.2.3 of the SEIS has been revised to incorporate the suggested revision.*

Comment: Page 2-24. The units seem to be in error and have been corrected below: "A concentration of 1000 µg/L was measured, which exceeds the State limit of 70 µg/L." (PP-28)

Response: *The Greek symbol for micro (µ) appears to have been omitted in the draft. The text has been corrected as suggested.*

Comment: Page 4-6. The following statement is included on page 4-6: "These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants...." This finding concerns cooling-tower based dissipation system, which does not currently include OCNGS as it has a once-through cooling system. This should be corrected in any final document. (PP-30)

Response: *This Category 1 issue actually applies to all plants, including those with cooling-tower-based systems and once-through systems. As stated in the finding, discharges have been mitigated at “other plants,” which in this case refers to plants with a once-through cooling system. The text has not been changed in response to this comment.*

Comment: Page 4-11. This statement should be clarified to reflect the lack of definition for adverse environmental impact in the Phase II regulations: “While adverse environmental impact is undefined in the EPA Phase II 316(b) regulations, entrainment of fish and shellfish into the cooling-water system is a potential adverse environmental impact...” (PP-31)

Comment: Page 4-11. The following sentence needs to be better worded and the threshold level of eligibility under the Phase II regulations should be included for clarification purposes: “The rule is Phase II in the EPA’s development EPA has developed of Phase II 316(b) regulations that establish national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that exceed a 50 MGD threshold value for water withdrawals.” (PP-32)

Comment: Page 4-11. These sentences as written are factually incorrect in their description of the Phase II 316(b) regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards. In addition, compliance with any performance standards is not required at the time of permit renewal although any issued permit could attain a schedule for compliance. Suggested wording to correct these inaccuracies is as follows: “This rule allows for five compliance alternatives where two of these alternatives concern attainment of the .—The new performance standards are designed to significantly reduce entrainment losses resulting from plant operations. Licensees are required to demonstrate compliance with the Phase II regulations performance standards at the time of renewal of their NPDES permit.” (PP-33)

Comment: Page 4-12. A reference to a later part of the document should be included to ensure that the reader understands that these underestimates were accounted for. “Thus, on the basis of the Summers et al. (1989) analysis, it is possible that the entrainment numbers presented by EA (1986) were underestimates of actual entrainment. However, as described on page 4-14, these numbers were adjusted for the purposes of evaluating impacts.” (PP-34)

Comment: Page 4-13. Because there is documented entrainment survivability via the dilution pumps, as referenced in studies conducted at OCNGS, a clarifying statement that the estimation of impacts via the Versar report is conservative should be included. “Because the 316(a) and 316(b) demonstration report did not provide estimates of circulating-water system macrozooplankton entrainment losses for each year or estimates of dilution pump entrainment losses, Summers et al. (1989) conservatively estimated losses by assuming a 100 percent mortality rate for all entrained organisms (circulating-water system and dilution pumps).” (PP-35)

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Comment: Page 4-15. As written the statement that there is no "clear" definition could be misconstrued to an understanding that there is "no" definition for calculation baseline or that any such definition is implied. Because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity. In addition, the word mortality should be stricken to be consistent with the wording in the national performance standards as contained at 40 CFR 125.94(b)2. Suggested changes are as follows:

The entrainment performance standards in the EPA's Phase II regulations requires that entrainment mortality for all life stages of fish and shellfish be reduced by 60 to 90 percent from the calculated baseline, although there is ~~no clear definition of~~ ambiguity as to how the baseline is to be calculated.... (PP-37)

Comment: Page 4-15. On page 12 of the draft NJPDES permit, the Department states that closed-cycle cooling and restoration are the only means available at this time to reduce or offset entrainment losses. As such, the following statement should be clarified to be consistent with the draft NJPDES permit: "Based on the results of this and other studies, the State of New Jersey may require additional mitigation measures, such as the installation of cooling towers or restoration, to reduce or offset entrainment." (PP-38)

Comment: Page 4-16. Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit: "Regardless of the determination of impact, compliance with EPA's Phase II regulations may require modifications to the facility and/or the implementation of restoration measures." (PP-39)

Comment: Page 4-16. Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit: "As part of the NPDES renewal, licensees may be required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures, which could include restoration measures, as a result of this regulation." (PP-42)

Response: *The text in Section 4.1.1 has been modified in response to the comments.*

Comment: Page 4-16. It is important to make the distinction that there is no definition of adverse environmental impact contained in the Phase II regulations. This statement should be clarified as follows: "While adverse environmental impact is undefined in the Phase II regulations, I impingement of fish and shellfish into the cooling-water system is a potential adverse environmental impact." (PP-40)

Comment: Page 4-16. These sentences as written are factually incorrect in their description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the word "losses" should be substituted with "mortality" to ensure consistency with the wording in the national performance standards. Suggested wording is as follows: "This rule allows for five compliance options where two of these options concern the attainment of ~~The~~ new performance standards are designed to significantly reduce impingement mortality losses resulting from plant operation. Licensees are required to demonstrate compliance with the Phase II regulations ~~performance standards~~ at the time of renewal of their NPDES permit." (PP-41)

Comment: Page 4-21. As stated previously for page 4-15, the following statement that there is no "clear" definition of calculation baseline could be misconstrued to an understanding that there is "no" definition for calculation baseline or that any such definition is implied. However, because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity as follows: "The impingement performance standards in the EPA's Phase II regulations requires that impingement mortality for all life stages of fish and shellfish be reduced by 80 to 95 percent from the calculated baseline, although there is ~~no clear definition of~~ ambiguity as to how the baseline is to be calculated." (PP-44)

Comment: Page 4-22. Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and is separate than modifications to the facility, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

Regardless of the determination of impact, compliance with the EPA's Phase II regulations may require modifications to the facility or the implementation of restoration measures. (PP-45)

Comment: Page 4-22. Because the operating license for OCNCS expires on April 9, 2009, this statement contains erroneous dates for the expiration date of the operating license. "The fact sheet describes the principal facts and the significant legal and policy issues considered by NJDEP during the preparation of the draft permit that will govern activities at OCNCS until the permit expires on April 30, 2009 (the same ~~date~~ month that the current OL for OCNCS expires)." (PP-46)

Comment: Page 4-23. The statement regarding violation of surface water quality standards, and thereby necessitating a thermal variance, was not contained in the July 19, 2005 fact sheet but rather was contained in the 1994 NJPDES permit fact sheet. Therefore, this statement should be modified as follows: "The results of the overflights demonstrated that the thermal plume extent and width often violated State surface-water quality standards, thereby requiring a thermal variance, as described in the NJDEP (1994 ~~2005~~) fact sheet." (PP-47)

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Response: *The text in Section 4.1.3 has been modified in response to the comments.*

Comment: Page 4-19. It is unclear from the following statement as to who's conclusions are summarized in the paragraphs that follow this section and the age of any documents and/or data reviewed.

The NRC staff also compared its assessment of impacts with the conclusions stated in Kennish (2001), because the author has reviewed most of the information available to the NRC staff. A summary of the conclusions associated with impingement impacts follows. (PP-43)

Response: *This paragraph has been revised to indicate that Dr. Kennish's conclusions were based on his review of the original 316(a) and 316(b) studies conducted between 1975 and 1977.*

Comment: Page 4-45. The Department agrees that sea turtles are impinged at the OCNCS intake structure and has confirmed that the data presented in Table 4-13 is correct. However, information contained on page 4-52 is also relevant to this section and should be included as follows to ensure a full understanding of the issue: "Most impinged turtles at OCNCS are impinged on the trash racks associated with either the circulating-water or dilution-water intake systems. In many cases, the dead sea turtles captured at OCNCS appeared to have died elsewhere, and in some cases, dead sea turtles exhibited wounds consistent with injuries from small boat propellers." (PP-49)

Comment: Page 4-45. A date should be included in the below excerpt to include a date as to when OCNCS procedures were revised. "Past difficulties in the preparation, storage, and shipping of turtles for necropsy have resulted in the loss of important data concerning the cause of death; recently, however, OCNCS procedures have been revised on [insert date] to correct these problems." (PP-50)

Response: *The text in Section 4.6.1 of the SEIS has been modified in response to the comments.*

Comment: Page 8-2. This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the national performance standards require a reduction in "impingement mortality" which is distinctly different than a reduction in "impingement". Suggested wording is as follows:

The EPA's Phase II regulations ~~call for reducing~~ establish five compliance alternative where two of these alternatives concern the attainment of a reduction in impingement mortality the number of organisms impinged at the intake structure by 80 to 95 percent of baseline, and reducing

organisms entrained through the cooling system by 60 to 90 percent of baseline (EPA 2004a). (PP-51)

Comment: Page 8-2. This sentence as written does not accurately represent the NJDEP draft fact sheet. Specifically, NJDEP included a statement that the second alternative could only be pursued if closed-cycle cooling was "unavailable". Suggested wording is as follows:

The NJDEP indicated that if AmerGen Energy Company, LLC (AmerGen), can demonstrate that a closed-cycle cooling system is unavailable ~~not a feasible alternative~~ for OCNGS, AmerGen could implement another alternative, which is to "select, install, properly operate, and maintain a combination of design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures" endeavor to meet the national performance standards for impingement and entrainment. (PP-52)

Comment: Page 8-3. This characterization of the second alternative as contained in the NJDEP draft permit fact sheet is incorrect. The second alternative does not only require restoration measures, but also requires improvements at the intake structure. In addition, while the Department made reference to wetlands restoration as a viable restoration alternative, the Department did not limit the permittee to only this alternative. In addition, restoration measures are defined broadly in the EPA Phase II regulations. Restoration measures at OCNGS could include restoration measures, fish ladders, restoration of shellfish beds, preservation of lands etc. Changes are suggested as follows:

The second alternative considers a requirement to implement restoration measures, which could include the restoration of ~~restore~~ wetlands, coupled with improvements to the existing intake structure and operations. (PP-53)

Comment: Page 8-24. This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards.

The NJDEP identified construction and operation of a closed-cycle cooling system (Section 8.1.1) as its preferred alternative to demonstrate compliance with Section 316(b) regulations ~~meet national performance standards for impingement and entrainment losses.~~ (PP-58)

Comment: Page 8-24. The excerpt below has several incorrect references to either the draft NJPDES permit or the EPA Phase II regulations. First, as stated above for page 8-3 referenced above, restoration measures in the draft NJPDES permit are not limited to only the restoration of wetlands since restoration measures are defined broadly in the EPA Phase II regulations.

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Secondly, the entrainment performance standard is compared against baseline conditions which should be referenced as it was for the impingement performance standard. Third, it would have been inappropriate for NJDEP to have included specific information in the draft NJPDES permit about viable operational or design changes to reduce impingement and entrainment given the fact that the EPA Phase II regulation requires for this information to be submitted in a Comprehensive Demonstration Study that is due on January 7, 2008. This should be appropriately referenced. Suggested changes are as follows:

This alternative would reduce impingement and entrainment losses by retrofitting the existing system with improved technology, altering operations of the system, and ~~restoring wetlands~~ the implementation of restoration measures within Barnegat Bay to meet national performance standards that require 1) reduction in impingement mortality for all life stages of fish and shellfish by 80 to 95 percent from baseline conditions, and (2) reduction in entrainment for all life stages of fish and shellfish by 60 to 90 percent from baseline conditions. In describing this alternative, the NJDEP ~~provided little information regarding operational or design changes that might be employed at OCNGS to reduce impingement and entrainment losses~~ acknowledged that there are limited design and construction technologies available to reduce entrainment at this time. An identification and analysis of appropriate design and construction technologies is due to NJDEP as part of a Comprehensive Demonstration Study in accordance with the deadline of January 7, 2008 as set forth by EPA in its Phase II regulations. (PP-59)

Comment: Page 8-25. The below excerpt concerning NJDEP's identification of 103 high priority sites is somewhat vague and should be made more specific. Suggested changes are as follows: "In its draft NJPDES permit for OCNGS, the NJDEP referenced the 1995 The Trust for Public Land's report entitled "The Century Plan: A study of One Hundred Conservation Sites in the Barnegat Bay watershed" identified 103 high-priority sites within the Barnegat Bay watershed that could be considered by AmerGen for restoration." (PP-61)

Response: *The text in Section 8.1 has been revised as suggested in the comments.*

Comment: Page 8-12 – 8-13. The Department agrees that any reduction in impingement losses via a closed-cycle system as compared to a once-through system would depend on the species affected. However, it is not clear from this excerpt how this conclusion can be drawn. The following language is suggested to help bridge this gap in understanding: "Although impingement would be substantially reduced by using a closed-cycle this system, if it is assumed that a reduction in flow results in a corresponding reduction in impingement and entrainment, which is suggested by EPA in its preamble to the Phase II regulation, it is reasonable to assume that impingement would be reduced by 70 percent. However, because a closed-cycle cooling system does not require Ristroph traveling screens and therefore all organisms impinged would be killed, there would not necessarily be an overall reduction in impingement mortality via a closed-cycle cooling system as compared to the current system. Specifically, current documented levels of impingement survivability for Representative

Important Species with the Ristroph traveling screens are around 88% which is higher than 70%. Therefore, impingement mortality could be greater with the closed-cycle cooling system. Any, the reductions in impingement losses would only be evident for those species known to have high impingement mortality (e.g. , bay anchovy [*Anchoa mitchilli*], Atlantic silverside [*Menidia menidia*], and Atlantic menhaden [*Brevoortia tyrannus*]; see Section 4.1.2). Species with low impingement mortality (winter flounder [*Pseudopleuronectes americanus*], sand shrimp [*Crangon septemspinosa*], and blue crab [*Callinectes sapidus*]) would be less affected by this alternative. The reduction in flow may also reduce sea turtle impingements.” (PP-57)

Response: *Because of the large flow reduction associated with a closed-cycle system and the reduction in approach velocity to the traveling screens, the NRC staff does not believe that the impingement and entrainment mortality could be greater with a closed-cycle system. It is likely that the licensee would use the existing intake which has a fish return system that could continue to be operated during closed-cycle cooling. Additionally, impingement losses do not exhibit a linear relationship to through screen flow velocity particularly at the lower (0.5 ft/sec) flow rates. A reduction in intake flow to that which is expected for closed-cycle cooling would result in a significant reduction in impingement. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

Comment: Page 8-55. Any new coal plant, as discussed in the below excerpt, would be required to meet Phase I of EPA's section 316(b) regulations which applies to new facilities. The requirements for Phase I are significantly greater than those requirements for Phase II facilities and should be taken into account in any rating of impacts. This is corrected as follows: “This section discusses the environmental impacts of constructing and operating a coal-fired plant using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are similar to the impacts for a coal-fired plant using the closed-cycle system. However, there are minor differences in impacts between the closed-cycle and once-through cooling systems. Table 8-4 summarizes these differences. The design and operation of the intake would need to comply with Phase I ~~Phase II performance standards~~ of the EPA's section 316(b) regulations to minimize adverse impacts associated with water withdrawal and heated discharges would need to comply with Section 316(a) regulations.” (PP-62)

Response: *Depending on the existence of current units on the proposed site, the applicant may be required to comply with either Phase I or II regulations. The text in Section 8.3 has been revised in response to the comment.*

Comment: Page Number 8-67, Line 37-39. What is in DEIS: Consideration of a new nuclear generating plant to replace OCNCS was not included in the AmerGen ER (AmerGen 2005). What it should be changed to: Recommended deletion of sentence. Why: Consideration of Advanced Nuclear Reactor as an alternative to the proposed project was considered in the AmerGen Environmental Report (See Section 7.2.1.4, Other Alternatives). The criterion for further consideration for impacts was the reasonableness of the alternative. In the case of

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Advanced Nuclear Reactor, it was judged to be extremely unlikely that this particular alternative would be licensed, constructed, and on-line in time for the expiration of the current operating license for Oyster Creek. (II-4)

Response: *The text in Section 8.3.3 has been revised to reflect that the applicant did not further evaluate the impacts of a new nuclear alternative in its ER because it did not consider new nuclear as a reasonable alternative to the proposed action. Nevertheless, the NRC staff did evaluate a new nuclear alternative based on the current national interest in new nuclear facilities and for completeness.*

A.2.12 Comments Concerning Decommissioning Issues

Comment: Environmental Impacts of Decommissioning, (Pages 7-1 through 7-5). 10 CFR 50.75(g) requires AmerGen to keep "records of information important to the safe and effective decommissioning" of the plant. Since Oyster Creek is at the end of an initial license, seeking re-licensing, the Department is requesting a copy of the OCNGS's 50.75(g) file. (PP-11)

Response: *Licensees are required to maintain certain records regarding decommissioning per 10 CFR 50.75(g). However, the NRC does not maintain copies of this file. The NJDEP authorities can obtain full access of this file via the Regulatory Assurance Manager at OCNGS. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.*

A.2.13 Issues Outside the Scope of the Environmental Review for License Renewal: Safeguards and Security; Operational Safety; Aging Management; Emergency Preparedness and Response; and Need for Power

Uncategorized

Comment: Page Number 4-25, Line Number 35-37. What it is in DEIS: This line is not considered within the scope of license renewal because it was not constructed for the specific purpose of connecting the station to the grid at the time of initial station licensing. What it should be changed to: The Conectiv line should be included within the scope for analysis of impacts for this proposed action. Why: This line should be included in scope. It is Exelon's understanding that National Environmental Policy Act (NEPA) court cases and Council on Environmental Quality guidelines indicate that scope should include connected actions, which include actions that will not proceed unless other actions are taken [40 CFR 1508.25(a)(ii)]. Operation of the new line is as much connected to Oyster Creek Generating Station operation as operation of the line currently considered in the DEIS. (II-3)

Response: *Transmission lines considered within the scope of license renewal SEISs are those lines constructed to provide the original connection of the plant to the regional electrical grid.*

The OCNCS-to-Manitou line was the only line originally built to provide that connection. The Conectiv line is determined to be outside the scope of the license renewal review. The comment provides no new and significant information; therefore, no changes were made to the SEIS in response to this comment.

Safeguards and Security

Comment: I was told at the time of TMI that the reactor containment building, at least there, was designed to take an aircraft hit from a 727, Boeing 727. Of course, the ones that did the World Trade Center were much bigger aircraft. Will a containment building take that? I don't know. (C-4)

Comment: The report was pulled from the NRC public database following the September 11th, 2001 terrorist attack because agency spokesman Neil Sheehan said if a terrorist decided to attack any plant in the United States, not just at Indian Point; that is, in formulation about which fatalities it could cause, the exact knowledge of that could be very advantageous to them. (H-3)

Comment: The report states that the analysis did not base their findings on events due to sabotage. No established method exists for estimating the likelihood of a sabotage. Nor is there a method for analyzing the effect of security provisions on that likelihood. (H-4)

Comment: While the supplement to the GEIS is not required to discuss actual need for power, economic cost benefits of alternatives or any aspect of the storage of spent fuel or terrorist threat, we believe that these issues are central to decision making for the energy future of New Jersey and the regional PJM electricity grid. (EE-3)

Comment: We are at war, and we do have a very, very mean, nasty enemy, and at any one time they could approach that plant from three or four directions and what would happen? As has been stated by some of the previous speakers, there would be almost cataclysmic results, and I just wonder what can be done. I don't know what the answer is, but I do know that these results that I mentioned, these statistics were not pulled off a tree, that they have been the result of research, and I hold out this information for the benefit of all the concerned NRC scientists who are present who have certainly gone to great lengths in expressing the way it should be and what can be, but let's not forget that we are at war even though we don't have an enemy right now at our shores, at our gates. (X-2)

Comment: Should we risk a terrorist attack at the site of a nuclear plant with on-site storage of spent nuclear fuel? (XX-3)

Comment: As a New York City-based organization, we are specifically concerned with the proposed license extension of OCNCS and its accompanying threats to regional security. (EE-1)

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Comment: The NRC is relying on a generic EIS that does not take current geopolitical realities or differentiations between reactor sites under consideration when deciding on potential accident risks. The 1996 GEIS for severe accidents at all reactors stated that the environmental impacts would be "small." This was done before 9/11 and without looking at site-specific vulnerabilities and distinctions of targets. AmerGen did not include external sabotage in their ER (NUREG 1437 Supplement 28, 5-7). (EE-15)

Comment: 9/11 should be a wake up call of what can happen by terrorists when they crashed 2 planes into two buildings. Think of the death and destruction of a Nuclear Plant attacked. You can be sure these terrorists aren't going to listen to our security plans telling them to get out of the restricted air space. (TT-3)

Comment: In particular, the DSEIS must assess the vulnerability of the dry cask storage systems to terrorist attack and the potential for environmental release of radioactive waste, and provide methods to mitigate these risks. (BBB-2)

Response: *Section 5.1.2 discusses the impacts of severe accidents, including sabotage. The GEIS findings state that compliance with the NRC regulatory requirements under 10 CFR Part 73 provide reasonable assurance that the risk from sabotage is SMALL. Even if such events were to occur, the Commission would expect that resultant core damage and radiological releases would be no worse than those expected from internally initiated events. Based on the above, the Commission concludes that the risk from sabotage and beyond-design-basis accidents at existing nuclear power plants is SMALL, and, additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents. The issues of need for power and onsite spent fuel storage are outside the scope of the license renewal review; therefore, no changes were made to the SEIS in response to these comments. Alternatives to renewal are discussed in Section 8 of the SEIS.*

Comment: I understand that out in California, the courts ruled against the NRC and said because of the design of the plant and the vulnerability of the fuel pool, that the NRC had to take into consideration a terrorist attack, even though the NRC claims it was very minimal. But the court said, "No. It is not minimal in this day and age." (J-2)

Comment: Finally, the Severe Accident Mitigation Alternatives (SAMA) submitted by AmerGen, while in compliance with NRC's regulations but not with guidance document NEI 05 01 (rev A), did not take into account terrorism events such as attacks involving large commercial aircraft. As the NRC is aware, the State of New Jersey has filed a contention with the Atomic Safety Licensing Board (ASLB) regarding this issue. While the ASLB argued that under the National Environmental Protection Act, license renewal does not have to consider very low probability events, after September 11, 2001, these events can no longer be considered zero probably. At present, the NEPA-terrorism debate continues with the NRC Commissioners' review of the

SAMA contention. The Ninth Circuit Court decision held that the NRC cannot categorically refuse to perform a NEPA-terrorism review. The legal process will continue until resolution which may result in the Ninth Circuit Court decision being upheld thereby requiring the NRC to include terrorism in NEPA reviews. Judgments on the state's contention regarding SAMA seem relevant for the continued operation of the Oyster Creek Nuclear Generating Station (OCNGS) and should be included for public assurance of the continued safe operation of the OCNGS.

As Commissioner Gregory B. Jaczko stated in a Memorandum and Order docketed on September 6, 2006, that considered the appeals of two prior ASLB decisions, an evaluation of terrorism events should be part of NEPA and that this process should start immediately in order to provide the necessary clarity for all future re-licensing of nuclear power plants. (PP-9)

Comment: In addition, recently, the Ninth Circuit, concluded that it was unreasonable for the NRC to categorically dismiss the possibility of terrorist attack on a proposed spent fuel storage installation and on the entire reactor facility as too "remote and highly speculative" to warrant consideration under NEPA. *San Luis Obispo Mothers For Peace*, 449 F.3d at 1030. The court also found, as a matter of law, that NRC's position was inconsistent with the government's efforts and expenditures to combat this type of terrorist attack against nuclear facilities including establishment of the NRC's own Office of Nuclear Security and Incident Response responsible for coordination with the Office of Homeland Security. *Id.* at 1030-31. Furthermore, the court found that to eliminate a possible environmental consequence from analysis by labeling a risk as "unquantifiable" is not supported by any provision of NEPA or any other authority cited by the Commission. *See also Limerick Ecology Action*, 869 F.2d at 754 (J. Scirica, dissenting) (finding no "statutory provision, no NRC regulation or policy statement, and no case law that permits the NRC to ignore any risk found to be unquantifiable") (BBB-4)

Comment: NRC had a longstanding policy that NEPA does not require consideration of the environmental impact of a terrorist attack. This was based on four 2002 decisions (Private Fuel Storage, Duke Cogema Stone & Webster, Dominion Nuclear Connecticut and Duke Energy) and the reasoning was as follows:

1. The possibility of terrorist attack is too far removed from the natural or expected consequences of agency action to require study under NEPA
2. Because the risk of terrorist attack cannot be determined, the analysis is likely to be meaningless.
3. NEPA does not require a "worst-case" analysis
4. NEPA's public process is not an appropriate forum for sensitive security issues.

This was set out in a memorandum and order, CLI-03-1,57 NRC 1, where the NRC accepted the Atomic Safety and Licensing Board's referral of its decision to reject the environmental contentions related to terrorism. *San Luis Obispo Mothers For Peace*, 449 F.3d 1016. As discussed above, the Ninth Circuit has now ruled that the four reasons given by the NRC as

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grounds for this did not support the NRC's categorical refusal to consider the effects of a terrorist attack. *Id.* at 6084. Furthermore, the Ninth Circuit reiterated NEPA's direction on uncertain consequences 40 C.F.R. §§ 1502.22(b)(3), (4), which requires an agency to deal with uncertainties by including in the EIS "a summary of existing credible scientific evidence which is relevant to evaluating the reasonable foreseeable significant adverse impacts on the human environment, and...the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." The court construed the regulation to apply to those events with potentially catastrophic consequences "even if their probability of occurrence is low, provided that the analysis of impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 C.F.R. § 1502.22 (b)(4).

In addition, the NRC has now recognized that, if it is not overturned by the U.S. Supreme Court, the *San Luis Obispo* decision will require an analysis of spent fuel pool sabotage scenarios for Oyster Creek. Earlier this week, the NRC decided to postpone its review of the dismissal of a contention by the State of New Jersey that this analysis was essential, but missing. *In the Matter of AmerGen Energy Co. (License Renewal for Oyster Creek Nuclear Generating Station)*, LLC, CLI-06-24 (September 6,2006). (BBB-6)

Comment: In addition, as the Court of Appeals for the Ninth Circuit has found, the events of September 11,2001 mean that the NRC must now take account of terrorist risks in SEIS Reports about licensing decisions. *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Commission*, No. 03-74628,2006 WL 1511889 (9th Cir. June 2,2006). Furthermore, that assessment must be complete before the NRC can take any action to extend the license (BBB-12)

Comment: Terrorist attack impacts should be evaluated in EIS under NEPA: The recent decision of the Ninth Circuit court that the NRC "erred" in determining that the National Environmental Policy Act (NEPA) does not require the agency to consider potential environmental impacts of terrorist attacks at nuclear facilities. The determination that the possibility of terrorist attacks is not so "remote and speculative," and that they should be included under NEPA items for consideration. Given the location and spent-fuel pool vulnerabilities of OCNCS, the risks of an attack are relatively high and therefore potential environmental impacts should be considered in a supplemental EIS. License extension and continued waste generation will heighten the already elevated risk of an attack. (EE-16)

Comment: NRC should suspend all licensing proceedings under the National Environmental Protection Act -- Policy Act and its governance. We make this request in light of the Ninth Circuit Court of Appeals decision on June 2nd, which considered how NRC was handling the question of environmental consequences from a successful terrorist attack by a nuclear facility by providing a public hearing and an environmental review under and as required by NEPA.

NRC has repeatedly ordered that the environmental consequences of a terrorist attack on any nuclear facility is beyond the scope of these proceedings because they say that it's so speculative and remote that it cannot be considered in a site-specific proceeding. Well, the Federal Court found that NRC's denial of the public hearing on such security contentions to be unreasonable. In fact, it is our concern that NRC has failed to recognize and uphold its obligations to provide the public with a democratic hearing process as governed by law under NEPA, specifically with regard to our homeland security. And this is a very serious charge, and I'm sure that the NRC itself is not united and unanimous on the decision to withhold these public hearings from the public on particularly the issue that is so close to ground zero as Oyster Creek is to where we stand today. As such, now, this Environmental Impact Statement is fatally flawed by missing the analysis of the environmental consequence of terrorist attack on Oyster Creek. (N-1)

Response: *In LBP-06-07, the Atomic Safety and Licensing Board (ASLB) denied a proposed contention, raised by the state of New Jersey, maintaining that NEPA requires the NRC to consider the consequences of a terrorist attack on OCNGS as well as appropriate SAMAs. The State of New Jersey has since appealed the ASLB decision and has asked that the Commission consider the recent Ninth Circuit decision, holding that the NRC cannot categorically refuse to perform a NEPA-terrorism review. In CLI-06-24, the Commission stated that it would postpone its consideration of New Jersey's NEPA-terrorism arguments in OCNGS's case, pending further resolution in the courts. The Commission subsequently agreed to make a determination of the agency's response to the Ninth Circuit Court's decision and will provide direction to the NRC staff for the conduct of environmental reviews. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.*

Comment: The fuel pool. Sure, if everything is working all right and it's covered, it's not presenting a radioactive hazard. However, certainly environmentally it would be a disaster of the most catastrophic dimensions if anything were to go wrong there. (D-8)

Comment: There was a very interesting article in the Asbury Park Press, the Asbury Park Press dated November the 17th, year 2000. And it says, in effect, the tests offered meltdown in the spent fuel pool of a nuclear power plant because failed radiation-induced cancer in thousands of people, as far as 500 miles from the site, according to a U.S. Nuclear Regulatory Commission study, according to a U.S. Nuclear Regulatory Commission study.

The analysis of spent fuel pool meltdown also states that millions of people within a 500-mile zone might have to be evacuated for periods ranging from 30 days to one year and that people living within 10 miles of a nuclear plant might never be able to return to their homes.

It also states the potential for prompt fatalities from radiation poisoning that would occur in areas close to the plant, the plant site, where emitting radioactive particles would be expected to fall. The extent of possible radiation damage described in the NRC documents is far more severe

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than anything that Federal officials have disclosed in public forums or written statements. The agency assessments are contained in a special report prepared in October 2000 by experts within the NRC and the Sandia National Laboratories in Albuquerque, New Mexico. (H-1)

Comment: Instead, analysis examined various accident scenarios ranging from worker mishaps to plane crashes into spent fuel pools, buildings. The report concluded that although the probability of such accidents is extremely low, the effects of meltdown would be enormous. (H-5)

Comment: If you all have seen the pictures from the areas in Louisiana and Alabama post-Katrina, all of those same type of buildings that were warehouses virtually disappeared in the hurricane. They were blown down. I have tremendous concern about this because should any of this debris fall into the spent fuel pool, it can dislodge the racks of fuel rods that are in there. These fuel rods must be kept at certain spacing so that they maintain temperatures because if those temperatures are exceeded, they are encoated with something called zirconium, and this can burn. Very frequently the NRC and people from Oyster Creek will tell you that a Chernobyl cannot happen here. Well, a zirconium fire in the spent fuel pool is the same -- I shouldn't say "the same" -- is extremely similar to a fuel fire that happened to Chernobyl. The only difference is the consequences would be far more devastating because of the massive amounts of quantity of spent fuel that are in there. (O-9)

Comment: I am extremely concerned because in the past month and a half three small aircraft have dropped out of the sky and landed within 20 miles of Oyster Creek. One of them I know for a fact landed about 11 miles away on Route 72 because it landed about a mile away from my house. There were also two banner planes that have just gone down recently within a 20-mile region. So there has been some concern about a terrorist attack. God forbid that this should happen on the spent fuel pool, but it would seem from past history we don't even need that. We have planes falling out of the sky here that easily any one of them could have landed on this plant. (O-10)

Comment: I do have a little concern because of an article that I happened to read in the Wall Street Journal. That was on April 9th in 2002 in an article entitled "Nuclear War." As reported in the Journal on that date, Tuesday, April 9th, 2002, the Brookhaven National Laboratory located on Long Island estimated that a fire in a nuclear fuel storage pool could release enough radiation to render 188 square miles uninhabitable. In addition, this scientific research center estimated that, in quotes, tens of thousands of cancer fatalities and financial losses of \$50 billion would result in such an accident. (X-1)

Comment: In addition to the highly questionable safety of the Mark 1 containment design, its elevated spent fuel pool makes the station more vulnerable to and attractive as a target for sabotage or attack. The spent fuel cooling pool is open at the top and has no protective structure surrounding it. According to the National Academy of Sciences' report, a loss of

coolant event in the spent fuel pool would have long-term contamination effects greater than those from the Chernobyl accident. (EE-6)

Comment: The DSEIS is inadequate because it fails to consider the environmental effects of a spent fuel pool fire that could be caused by accident or by an act of terrorism. This failure, among others, means that the analysis of Severe Accident Mitigation Alternatives ("SAMA") is woefully inadequate. Calculations by experts show that a spent fuel pool fire could result from the packing of the spent fuel into the pool at high density, which was not originally intended. Such a fire could directly cause \$180 billion and \$1.8 trillion worth of damage, including over 24,000 lung cancers. This is around ten times the amount of damage caused by hurricane Katrina. At an estimated probability of around 1 in 10,000 per year, this imposes a risk to society that is valued at between \$200 million and \$3.6 billion. AmerGen stands to make around \$2.6 billion during the proposed 20 year extended operating period, provided nothing serious goes wrong with the plant during that time. Thus, the costs to society of the risk imposed by Oyster Creek are probably more than AmerGen would make from the electricity generated at the plant, even it operated at full capacity throughout the proposed 20 year extended license period.

This means that even closure of the plant would be a cost effective SAMA. Further, according to experts, transferring the spent fuel that is over five years old to dry cask storage would significantly lower the chance of a spent fuel pool fire at a cost of less than \$100 million. Indeed, AmerGen has quoted the cost as around \$30 million, and, incredibly, has described this as an "unnecessary expense." The failure of the DSEIS to consider the possibility of a spent fuel pool fire means that it currently violates the requirements of both the National Environmental Policy Act ("NEPA"), and the NRC regulations that implement NEPA. Thus, the SAMA analysis must be completely revised and presented as a new draft for additional public comment.

In addition, allowing Oyster Creek to continue to operate its spent fuel pool in such a reckless manner during any additional period of licensed operation would violate the Atomic Energy Act ("AEA"). Moreover, there are currently no acceptable means of containing the wastes that would be generated by further operation of the reactor. Therefore, the NRC should refuse to relicense the reactor, because to do so would be "inimical to the common defense and security or to the health and safety of the public." 42 U.S.C. § 2133(d). Furthermore, because allowing AmerGen to continue to operate a high density fuel pool does not offer "adequate protection" to public health and safety, as required by the AEA, NRC should also take urgent action to mitigate the current risk caused by the spent fuel pool at Oyster Creek. Although Citizens do not think that the Oyster Creek site is an appropriate place for the long term disposal of high level nuclear waste, the extreme imminent risk posed by the existing spent fuel pool means that Citizens are forced to accept an expedient, imperfect, and temporary solution to lower the risk. Thus, NRC should order AmerGen to transfer all spent fuel that is over five years old to the dry cask storage facility and to maintain sufficient spacing in the pool to minimize the risk of a spent fuel pool fire. The DSEIS must assess the consequences this action. (BBB-1)

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Comment: Although an NRC-sponsored study conducted as early as 1979 raised the potential for a severe accident in a high-density fuel storage pool if water is partially lost from the pool (NUREG/CR-0649, *Spent Fuel Heatup Following Loss of Water During Storage* (March 1979), the NRC has failed to take that risk into account in every EIS it has prepared including the 1979 GEIS on the environmental impacts of fuel storage and the 1996 License Renewal GEIS on which the Oyster Creek license renewal application relies. See NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* at 5-1 (1996).

The terrorist acts of September 11, 2001, the NRC's response to those attacks, and the finding of the Ninth Circuit in *San Luis Obispo*, show that the environmental impacts of intentional destructive acts against the Oyster Creek fuel pool are reasonably foreseeable. Taken together, the potential for severe pool accidents caused by intentional malicious acts and by equipment failures and natural disasters is not only reasonably foreseeable, but is likely enough to qualify as a "design-basis accident," i.e., an accident that must be designed against under NRC safety regulations. At minimum, such an event is a "severe accident." NRC's failure to take account of this new information when preparing the DSEIS is inconsistent with NEPA's major requirement that environmental decisions must take new information into account if the information shows that a proposed action will affect the quality of the human environment "in a significant manner or to a significant extent not already considered." *Marsh*, 490 U.S. at 374. (BBB-5)

Comment: I specifically asked a question about whether the spent fuel pool was included in the Environmental Impact Statement because this spent fuel pool is covered only by a steel building. There is no concrete covering of this. (O-8)

Comment: Thompson estimated the probability of an accidental fuel pool fire as 2.1×10^{-5} per year. This is around double the core damage frequency ("CDF") of 1.1×10^{-5} per year assumed by AmerGen. DSEIS at G-2. Although NRC may have looked at the chance of a spent fuel pool fire during decommissioning, many of the initiating events contributing to accidental spent fuel pool fires are not present during decommissioning. Thus, the risk of an accidental spent fuel pool fire during operation is significant and has not been assessed generically. Therefore this risk must be considered in the revised SAMA analysis, in addition to the risk of terrorist attack. At present, it is completely omitted. (BBB-9)

Comment: The Department is requesting that NRC make the OCNGS spent fuel pool (SFP) vulnerability analysis available to the Department since the SAMA does not include security requirements pertaining to the revised design basis threat analysis, including SFP vulnerability and aircraft attacks. (PP-10)

Comment: The presumption that a terrorist attack and subsequent fuel pool fire would not affect the environment in a critical way is in contradiction to the warnings from scientists, many government agencies and the National Academy of Sciences. (YY-5)

Comment: However, the License Renewal GEIS does not include any discussion of how deliberate and malicious attacks on nuclear power plants may increase the likelihood or consequences of severe accidents. In addition, the DSEIS it failed to make any assessment of the risks of sabotage. This is consistent with the NRC's long-established, but now obsolete, policy of refusing to examine such issues under NEPA. The rest of these comments show that the DSEIS is grossly deficient in this regard and is also deficient on many points of detail. The rest of the comments also provide a brief, very preliminary, assessment of the issues involved, based directly on work submitted by others to the NRC in pending license renewal proceedings.

A recent filing by the Massachusetts Attorney General in license renewal proceedings for Pilgrim and Vermont Yankee Nuclear Power Plants, which are both G.E. Boiling Water Mark 1 plants, similar to Oyster Creek, provided a quantitative analysis of the risk of spent fuel pool fires. The filing contains two expert reports, one on the probability of a spent fuel pool fire and the options to reduce that probability, and another on the consequences of a spent fuel pool fire. The report on probability finds that where high density racks of fuel assemblies are held in spent fuel pools, a loss of cooling or rupture of the pool would probably cause a spent fuel pool fire. Gordon R. Thompson, *Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants*, 9-12 (May 25, 2006) ("Risk Report"), Ex. SC 1.

The Risk Report concluded that the probability of a spent fuel pool fire is dominated by the possibility of a malicious attack. *Id.* at 57. Thompson estimated the total probability of a spent fuel pool fire at 1.2×10^{-4} per year for both plants, comprised of a 1×10^{-4} per year chance of a successful terrorist attack and 2.1×10^{-5} per year chance of an accidental fuel pool fire. The accidental risk is around double the core damage frequency ("CDF") assumed by AmerGen. DSEIS at G-2.

The other report submitted by the Massachusetts Attorney General in the same proceeding provides an analysis of the consequences of spent fuel pool fire at the Pilgrim and Vermont Yankee plants. It shows that the consequences of a spent fuel pool fire are comparable or worse than core damage accidents. Jan Beyea, *Report To The Massachusetts Attorney General On The Potential Consequences Of A Spent-Fuel-Pool Fire At The Pilgrim and Vermont Yankee Nuclear Plants* (May 25, 2006) ("Consequence Report"), Ex. SC 2. The results are truly sobering. Bayea shows that, even excluding the cost of cleanup from a spent fuel pool fire, the consequences of such a fire at these plants would range from \$87 billion to \$878 billion and the number of induced lung cancers would range from more than 2,700 to more than 24,000. *Id.* at 9, 11, 18-19.

Combining the estimates of event probability with the predicted consequences, the Risk Report shows that a consequence of \$100 billion at a probability of 1×10^{-4} per year over twenty years would have a present value of \$110 million to \$200 million, depending on the discount rate. Risk Report at 58. Thus, the consequence estimates of \$87 billion to \$878 billion combined

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with the probability estimate of 1×10^{-4} per year yield a range of around \$100 million to \$1.8 billion for the present value of the consequences. Therefore an investment in this range would be justified to avoid the consequences of a spent fuel pool fire. This is orders of magnitude greater than the screening value of \$4.46 million used by the NRC in the SAMA analysis. DSEIS at G-12.

The magnitude of the risk that would be imposed upon Citizens by extending the license for an additional 20 years has been grossly underestimated in the DSEIS because the analysis fails to take account of the potential for a fire in the spent fuel pool at Oyster Creek due to accident or deliberate attack. At a qualitative level the state of New Jersey has stated that the consequences of a spent fuel pool fire could be worse than the consequences of the accident at Chernobyl and that Oyster Creek is particularly vulnerable to an attack because the spent fuel pool at the plant is elevated and densely packed. Letter from Lipoti to Miller, dated July 30, 2004, Ex. SC 3.

More specifically, New Jersey noted that it had reviewed a scientific paper which generically estimated the consequences of a terrorist attack on the spent fuel pool:

The Alvarez Paper was available to New Jersey as was the NRC staffs review and comments. This paper focused on the potential generic vulnerabilities of spent fuel pools to terrorist attack. The paper also details the possible public safety and environmental consequences should such attacks successfully occur. Included in this paper were conservative estimates of the radiological release should a spent fuel zircaloy cladding fire occur due to a significant breach of a spent fuel pool. The paper states, "The long-term land-contamination consequences of such an event could be significantly worse than those from Chernobyl". The paper further states (in reference to Chernobyl), "The total area of this radiation-control zone is huge: 10,000 km², equal to half the area of the State of New Jersey. During the following decade, the population of this area declined by almost half because of migration to areas of lower contamination."

Id. The letter then went on to highlight the plant specific vulnerability of Oyster Creek because its spent-fuel pool is elevated, it has a relatively weak superstructure over the spent fuel pool, which could collapse, and it is on the coast providing an unimpeded flight path for an attacking aircraft. Id. letter concluded by requesting NRC to provide New Jersey with site specific estimates of the consequences of an attack on the spent fuel pool. Id. As far as Citizens are aware, no such estimate has been provided. More recently New Jersey attempted to intervene in the license renewal proceeding to contend, among other things, that AmerGen's SAMA analysis was inadequate because it failed to consider the vulnerability of the spent fuel pool or mitigation measures to address this vulnerability. Turning to a more quantitative approach, the situation at Oyster Creek is very similar to that at Pilgrim and Vermont Yankee. All three plants are G.E. Boiling Water Reactors with a Mark 1 containment system. In addition, all three plants store their spent fuel assemblies in high density racks that enclose the fuel with a neutron

absorbing material to allow fuel assemblies to be placed close to each other and fit more fuel into the spent fuel pool than originally intended. NRC, Information Notice No. 87-43 (September 8, 1987); Risk Report at 9-14. In 2002, Pilgrim and Vermont Yankee stored 2,274 and 2,671 fuel assemblies, respectively. Risk Report at 41. In 1995, Oyster Creek's operator obtained permission to store 2,645 fuel assemblies in its spent fuel pool. 60 Fed. Reg. 19,309 (April 17, 1995). In 2000, AmerGen obtained permission to increase the number of fuel assemblies in the spent fuel pool by 390 to 3,035 fuel assemblies. 65 Fed. Reg. 55,061-55,064 (September 12, 2000). This action was needed to allow for continued operation of the plant. *Id.*

Citizens are aware that Oyster Creek now has a dry cask storage facility that can store spent fuel that is over five years old. However, press reports indicate that AmerGen only transfers spent fuel to dry cask storage when it runs out of room in the spent fuel pool. Robert Manor, *US: New life for old nuclear plants*, Chicago Tribune, September 18, 2004, Ex. SC 4. Thus, it appears that the amount of spent fuel currently in the elevated pool at Oyster Creek could be larger than at Pilgrim or Vermont Yankee. For simplicity, this analysis assumes that the spent fuel pool has an inventory similar to Pilgrim and Vermont Yankee.

At root, risk is comprised of two basic elements, the probability of the event and the consequences. Regarding event probability, the State of New Jersey has suggested that Oyster Creek might be a more attractive target than other similarly designed nuclear power stations because it is closer to major population centers and, because it is on the coast, there is an unimpeded flight path. Thompson's estimate for the probability of a terrorist attack assumed that all plants are equally attractive targets. Thus, the likelihood of a spent fuel pool fire at Oyster Creek may be greater than at Pilgrim or Vermont Yankee. Although, Thompson's assumption is conservative for Oyster Creek, it is not unreasonable at the current level of uncertainty. Therefore, for simplicity, this analysis uses Thompson's estimate of 1.2×10^{-4} per year as the available best estimate of the chance of a spent fuel fire. The Commission has established a threshold of 1×10^{-7} per year as the threshold probability for design basis events at nuclear power plants. *In The Matter Of Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation)*, CLI-01-22,54 NRC 255 (November 14, 2001). Thus, Thompson's probability estimate is three orders of magnitude greater than the threshold probability for consideration in this nuclear power plant relicensing.

Turning to the consequences, Beyea's estimates of \$87 billion to \$878 billion in consequences for Pilgrim and Vermont Yankee are probably low because the population around Oyster Creek is larger, property values in the areas are higher than in Vermont or Massachusetts, contamination from a fire at Oyster Creek could contaminate major cities on the eastern seaboard, including New York City, Philadelphia, and Trenton, and the estimate excluded consideration of clean up or reconstruction of downtown areas. Thus, it is not unreasonable to estimate that the economic consequences could be at least double those estimated for Pilgrim and Vermont Yankee, ranging from around \$180 billion to \$1.8 trillion. At a frequency of 1.2×10^{-4} per year this is equivalent to a present value of between \$200 million to \$3.6 billion.

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Even more importantly, the number of induced lung cancers would probably be even greater than the 2,700 to 24,000 estimated for Pilgrim and Vermont Yankee because the population density in the potentially affected area is considerably higher on average.

The potential consequences of a spent fuel pool fire are startlingly large. As Beyea points out the US government borrows around \$350 billion per year. Because the government would be forced to foot nearly all of the bill for recovery after such a huge disaster [Note that the Price-Anderson Act could limit AmerGen's liability for this huge loss to \$400 million and force the federal government to meet all costs over \$10 billion.] it would have a massive financial impact on the nation. Furthermore, and perhaps even more importantly, such a disaster could lead to major loss of life, loss of confidence, and long-term contamination of large areas. Taken together, these effects could have a devastating long term impact on major cities, such as New York City, Philadelphia, and Trenton. To put the consequence estimates into context they are around ten times the damage estimates for hurricane Katrina.

To look at it from a different perspective, AmerGen currently claims to be making around \$25 per Mwhr produced. Exelon Press Release, dated July 31,2006 at 6, Ex. SC 5. Thus, assuming plant capacity of 619 Mw and a capacity factor of 95%, the total value of the electricity that could be produced by AmerGen at Oyster Creek during the proposed 20-year license extension is at most \$2.6 billion or \$129 million per year, even if nothing serious went wrong with the plant for 20 years. Thus, the externalized risk to society from the operation of the plant could actually be greater than the value to its owner of its output. In such circumstances, if no other mitigation options are available, plant closure and decommissioning would be a feasible SAMA alternative.

Plant closure and decommissioning must therefore be evaluated as a SAMA alternative in the DSEIS and Citizens believe that this is the only approach that would provide acceptable levels of risk over the long term. However, because the risk is large and imminent there is a need to mitigate this risk in the short term, rather than waiting for decommissioning. Therefore, as an initial temporary option, the dry cask storage facility offers an imperfect, but nonetheless useful option to mitigate the present risk. According to Thompson, the spent fuel at Pilgrim and Vermont Yankee that is more than 5 years old could be stored in dry casks at the site at a cost of \$43 million to \$87 million. Risk Report at 56. AmerGen has placed the cost of dry cask storage at Oyster Creek even lower at \$30 million. Robert Manor, *US: New life for old nuclear plants*, Chicago Tribune, September 18,2004, Ex. SC 4. This cost would be incurred anyway at decommissioning, so that the net effect is to change the time at which the expenditure occurs. Risk Report at 32. Thus, the cost to AmerGen of this measure could be offset by reductions in decommissioning cost. Depending on discount rate and the life of the plant, the net cost could be between \$15 million and \$40 million.

In this way, the spent fuel pool could be converted back to its original function to turn a massive and unacceptable risk into a lower, but still unacceptable long-term risk, at relatively low cost.

Id. at 32. Indeed, although the situation is highly uncertain, the lowest estimate of the present value of risk exceeds the highest estimate of the cost to mitigate that risk. It is therefore unclear why the NRC has not already required the risk of spent fuel pool fires to be mitigated at Oyster Creek and other reactors with elevated fuel pools. At minimum, the next draft of the DSEIS must contain a full site-specific analysis of the likelihood and consequences of a spent fuel pool fire and assess how to carry out effective mitigation. However, merely carrying out an assessment is not enough. Even this brief assessment has shown that the densely packed elevated fuel pool at Oyster Creek currently presents terrorists with a chance of killing 20,000 to 50,000 people and causing economic disruption on a scale that dwarfs even major natural disasters like hurricane Katrina. The risk posed by the plant is totally unacceptable and has a present value of over \$200 million and \$3.6 billion. The net cost of transferring the fuel to a less dangerous means of storage is between \$15 million and \$40 million. Therefore, there is no question that this action meets SAMA requirements. To provide "adequate protection" for the public, NRC should take urgent action to lower the risk by ordering that the spent fuel that is beyond 5 years old to be moved to dry cask storage for temporary storage.

Unfortunately, dry cask storage is not a risk free activity. Highly active nuclear waste was never intended to be stored at wet coastal sites in densely populated areas. The difficulty that the Department of Energy has had in showing whether the Yucca Mountain long-term disposal facility for this material could be acceptable, shows that storage of this material at the Oyster Creek site in the long term could not present an environmentally sound approach. In addition, concerns have been raised about the vulnerability of dry cask stores to terrorism. At minimum, the next draft of the DSEIS must consider the security and environmental risks of dry cask storage at this site for the current fuel inventory. This assessment shows that at present the failure to find a responsible approach to managing nuclear waste is causing a huge risk to the people of New Jersey and other states. This risk can be reduced, but cannot be totally eliminated, by moving the spent fuel to dry cask storage as quickly as possible. Because there is currently no acceptable method of disposing of spent fuel, it is simply irresponsible to allow AmerGen to continue to generate waste. Thus, Citizens firmly believe that the NRC should not allow AmerGen to operate Oyster Creek beyond its currently licensed operating period. At minimum, the DSEIS must assess how increasing the amount of spent fuel stored at Oyster Creek by 50% would change the current risks presented by the spent fuel on the site to the public and the environment.

Although the NRC has been on notice of the potential for spent fuel pool fires since at least 1994, the risk of such a fire being caused by terrorist attack has not been assessed generically. Thus, the reliance in the DSEIS on a generic determination of environmental significance of spent fuel pool storage during decommissioning is misplaced. DSEIS at xvi-xvii. By failing to analyze the risk of spent fuel pool fire from a terrorist attack or an accident during operation, the DSEIS is grossly deficient and would violate NEPA requirements unless this deficiency is remedied. (BBB-8)

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Response: *Section 5.1.2 discusses the impacts of severe accidents, including sabotage. The GEIS findings state that compliance with the NRC regulatory requirements under 10 CFR Part 73 provide reasonable assurance that the risk from sabotage would be small. Even if such events were to occur, the Commission would expect that resultant core damage and radiological releases would be no worse than those expected from internally initiated events. Based on the above, the Commission concludes that the risk from sabotage and beyond-design-basis earthquakes at existing nuclear power plants is small, and, additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents.*

Regarding the analysis of spent fuel pool accidents, the ASLB, in LBP-06-07, states, "because on-site spent fuel is a Category 1 issue, New Jersey's contention challenging AmerGen's SAMA analysis for failing to consider OCNGS's spent fuel pool is beyond the scope of this proceeding and, thus, not admissible." Spent fuel pools are robust structures constructed of very thick steel-reinforced concrete walls and possess a stainless steel liner. They contain enormous quantities of water, and as a result for most events, plant operators would have significant amounts of time to correct any problems. In addition, nuclear plants possess many other sources of cooling water that are readily available for cooling spent fuel. The comments are outside the scope of the license renewal review; therefore, no changes were made to the SEIS in response to these comments.

Operational Safety

Comment: The public's nuclear radiation risk is and continues to become worse as a result. Little, if any, new and important safety-related development is occurring. I hope I am wrong about that statement. (C-3)

Comment: Because I live in the shadow of Oyster Creek nuclear plant, I am basically concerned with what seems to be not within the purview of the renewal of the license; that is, radiation exposure, either due to the containment system being faulty or not having been checked. And I understand that that is not within your purview for renewal. (F-1)

Comment: The issues that I am concerned about, the most important of which is that the containment system, which was supposed repaired about ten years ago, has not been repaired or looked at since then.

Why AmerGen refused to have a second or third party look at that containment system I don't know. I would like to have an answer to that and why the cooling system that the Environmental Protection Agency required later on did not have to be done. That was a couple of years ago. They said it would not be financially feasible. And that was not explained either.

So I guess my biggest concerns are maybe not with NRC -- I don't know -- but with AmerGen and, again, with the renewal without questions being answered. (F-3)

Comment: I am also part of the organization Jersey Shore Nuclear Watch, which part of this coalition that's looking at the severe corrosion in a drywell liner.

For months and months and months we asked to look at ultrasonic test data of this drywell liner from 1996. It was not given to us. We were told it was proprietary information.

It has since come out through this public meetings and through legal actions, and the conclusion is that this data shows that the drywell has actually grown thicker. In some miraculous feat of God defying the physics that we know, the metal has actually gotten thicker, and this is well beyond the margins of error that could be shown in the testing, which leads us to believe that obviously this data was seriously flawed.

The NRC did not seem to notice this for over ten years because this data was done in 1996 and they were in possession of this since 1996. So we have serious reservations that they are really protecting us, which is what they are supposed to be doing. They are not supposed to be trying to keep this plant open no matter what. (O-17)

Comment: It is imperative that all safety factors and concerns be examined. How can the NRC be allowed to ignore issues which the State of New Jersey considers important? The steel drywell liner, the barrier preventing the release of radiation during a reactor accident, needs close scrutiny. Why are tests not being done now to measure the thickness of the drywell liner, despite previous evidence of corrosion? (XX-2)

Comment: It has been documented by citizens and verified by NRC engineers, that AmerGen has used flawed data for 10 years in estimating the status of a critical safety component, namely, the drywell liner. Further, its owner Exelon had not provided information to the NRC about its ten-year leak of tritium at its plant in Illinois. (YY-6)

Response: *The NRC's ongoing safety oversight focuses on prevention of safety problems so that potential issues like aging and thermal shock do not lead to accidents and subsequent environmental impacts. To the extent that the comments pertaining to safety of equipment and aging such as corrosion of the dry well are within the scope of license renewal, these issues will be addressed during the parallel safety review performed under 10 CFR Part 54. Operational safety issues are outside of the scope of the license renewal review. Although a topic may not be within the scope of review for license renewal, the NRC is always concerned with protecting health and safety. Any matter affecting safety can be addressed under processes currently available for an existing operating license absent a license renewal application.*

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The comments are outside the scope of the license renewal review; therefore, they will not be evaluated further in the context of the environmental review. However, the comments will be forwarded to the project manager for the license renewal safety review for consideration. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Comment: I also have a tremendous loss of feelings of credibility with the NRC that relate to actually coming to one of these first meetings less than a year ago. At that meeting I held up a picture of the reactor at Davis-Besse, which I don't know how many of you can see, but it's extremely rusted and corroded. The NRC was in possession of this picture, as well as the operators of the plant, and yet the NRC continued to allow this to operate to the point where they had a corrosion hole that was the size of a football. This was in the top of the reactor. Had this gone all the way through, this reactor would have gone critical, and they would have had a major core meltdown. They assured me that they had paid a lot of attention to that and were looking extremely closely at this plant and would not allow something like this to occur again. (O-6)

Response: *The reactor vessel head corrosion event at the Davis-Besse Nuclear Plant is an operational issue and outside the scope of license renewal. The event has had, and continues to have, a significant effect on both the NRC and reactor licensees. The corrosion event was unexpected and unknown to both the industry and staff. The corrosion was discovered by the licensee during an NRC-required inspection resulting from safety concerns related to reactor vessel head nozzle circumferential cracking. Since the discovery of the reactor vessel head corrosion event at Davis-Besse, the NRC has significantly increased the oversight of licensee reactor vessel head activities and other activities that may affect the condition of the reactor vessel head. Almost immediately after the discovery, the NRC strengthened reactor vessel head inspections by the imposition of inspection requirements by order. The immediate initiatives by the NRC staff provide assurance that any further corrosion events will be identified early and corrected. The NRC also formed a Lessons Learned Task Force (LLTF) to carefully review the Davis-Besse incident and make recommendations for improvement. The LLTF has made recommendations for improvements in reactor vessel inspection requirements, inspection program management and inspector qualification, handling of operating experience information, and research activities relating to leakage detection methodologies. The NRC is confident that the implementation of the 49 LLTF recommendations will preclude any future recurrence of reactor vessel head corrosion similar to that at Davis-Besse.*

Aging Management

Comment: High risk "wear-out" phase of operation: Nuclear reactors are at the highest risk for failure as they approach the end of their engineered lifespan. A twenty year extension to the forty-year operating license would bring the facility into the high-risk "wear-out" segment of the bathtub curve for failure risk. The GE Mark 1 BWR design of OCNCS is such that in the event of

an accident the containment system's only mechanism to avoid a core meltdown would be the direct release of radioactive steam.

The regulatory track record shows that age-related damage at reactors is most-often identified only after they become self-revealing. Based on this track record, we can only assume that there is undetected age-related degradation occurring. Unfortunately, the current regulatory and inspection regime at the NRC has not been effective at identifying these serious threats to reactor integrity and enacting appropriate prevention and protection measures, nor has AmerGen demonstrated a satisfactory level of regard for public safety in their operations. Extending the operational license for OCNGS will dramatically increase the risks for system failure and catastrophic release of radiation. (EE-4)

Comment: In spite of the best maintenance and replacement of parts, the older our car, the greater the likelihood our car will break down. If we want to ensure that we will get to work every day, safely, we routinely replace our car with a new one. How long would we continue to drive a car, or should we operate a nuclear plant, which could break down with dire consequences? (XX-7)

Response: *The principal safety concerns associated with license renewal are related to the aging of structures, systems, and components important to the continued safe operation of the facility. When the plants were designed, certain assumptions were made about the length of time each plant would be operated. During the safety review for license renewal, the NRC must determine whether aging effects will be adequately managed so that the original design assumptions will continue to be valid throughout the period of extended operation, or verify that any aging effects will be adequately managed. For all aspects of operation, there are existing regulatory requirements governing a plant that offer reasonable assurance of adequate protection if its license were renewed.*

The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Safety matters related to aging are outside the scope of this environmental review. An NRC safety review for the license renewal period is conducted separately. The comments provide no new and significant information; therefore, no changes were made to the SEIS in response to these comments.

Emergency Preparedness

Comment: The report was designed as an official NRC planning regulation in February 2001. A copy of the report was obtained by the Journal News. That's a New York paper. The report provides the basis for any future NRC regulations on evacuation needs, safety requirements, and insurance that compares the possible damage caused by a spent fuel pool meltdown with that of a meltdown in a fully operational nuclear reactor. It was developed to show the NRC what types of problems could occur in spent fuel pools when nuclear plants are shut down, at

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which point the new fuel rods would be placed in the pools and how long they might pose a danger from meltdown and fire.

The potential spread contamination cited in the report far exceeds the ten-mile zone the nation's nuclear plants currently use in developing emergency evacuation plans. NRC officials said the evacuation plans are intended to deal only with short-term radiation poisoning, which is not likely to occur outside of the ten-mile zone. (H-2)

Comment: In the event of an accident, the evacuation route is unworkable for much of the area, including all of Long Beach Island. (XX-4)

Response: *The NRC considered the need for a review of emergency planning issues in the context of license renewal during its rulemaking proceedings on 10 CFR Part 54, which included public notice and comment. As discussed in the Statement of Consideration for rulemaking (56 FR 64966), the programs for emergency preparedness at nuclear power facilities apply to all nuclear power facility licensees and require the specified levels of protection from each licensee regardless of plant design, construction, or license date. Requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all OLS and will continue to apply to facilities with renewed licenses. Through its standards and required exercises, the Commission reviews existing emergency preparedness plans throughout the life of any facility, keeping up with changing demographics and other site-related factors. Therefore, the Commission has determined that emergency preparedness is outside the scope of license renewal and there is no need for a special review of emergency planning issues in the context of an environmental review.*

Safety requirements and insurance are also outside the scope of the review. Safety related renewal issues are addressed in the ongoing safety review, which will be summarized in the staff's Safety Evaluation Report to be issued early in 2007.

The comments are outside the scope of the license renewal review; no changes were made to the SEIS in response to these comments.

Comment: The location of OCNCS in a high population density area along the eastern seaboard further differentiates it from other reactor sites. It is situated 50 mi east of Philadelphia and 60 mi south of Newark, with population growth rates for Ocean County among the fastest in the country. The severe impediments to successful and timely evacuation of residents and summer transients from the region as well as long-term environmental contamination and population displacement following an accident are not given just weight in the GEIS Supplement 28. (EE-9)

Comment: NRC concludes that there are no impacts since the 1996 GEIS was prepared (4-32). How can this be, when the GEIS referred to is 10 years old? Ocean County has had

significant population growth and increased traffic. Have there been any changes to the evacuation plan? Did NRC consider expected population growth during the relicensing period and how that growth impacts already stale findings from 1996 regarding evacuation and other impacts? (MM-61)

Response: *The comments are noted. The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Appropriate measures have been incorporated into the emergency preparedness plans. While this is a legitimate matter of concern, it should continue to be addressed through the ongoing regulatory process as a current and generic regulatory issue that affects all nuclear facilities. All licensees of nuclear power stations are required to conduct a full-scale emergency exercise every 2 years. Offsite entities, such as the State and local governments and the U.S. Federal Emergency Management Agency, have responsibility for offsite emergency planning. Perceived deficiencies in the emergency plans should more appropriately be directed to the governmental entities that have responsibility for the specific portions of the plan that are judged to be deficient.*

The comments are outside the scope of the license renewal review; no changes were made to the SEIS in response to these comments.

Need for Power

Comment: The Oyster Creek contributes a maximum of 650 megawatts. And we all know that that is presenting a huge risk to Ocean County and to the rest of the State, certainly the adjoining counties, for a very small amount of electricity. I don't see a cost-benefit or a risk-benefit assessment giving us anything but very negative results on that. (D-6)

Comment: How much of the energy generated by Oyster Creek is benefitting the people in the area where Oyster Creek is situated? Do we in Ocean County have any of that energy? Do we benefit from any of that energy? (F-5)

Comment: Finally, New Jersey and regional consumers are not dependent on OCNCS for electricity generation. The regional PJM grid has ample supply of excess capacity and statewide efficiency measures and increased reliance on and deployment of renewable energy sources will enable New Jersey to meet future electricity demand without compromising the safety or economy of the region. (EE-17)

Comment: The NJBPU, in conjunction with many state agencies, including the NJDEP, has begun developing a regional Energy Master Plan that examines the state's energy needs for the next 20 years. Throughout this process, New Jersey regulators will be making decisions about what is needed to meet New Jersey's energy demand. They will consider impacts to both the environment and the economy and will assume that plants will likely be retired, including Oyster

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Creek and several aging coal plants. In addition, several measures recently adopted by the legislature and the NJBPU will deliver substantial energy savings and increase renewable energy development. (MM-78)

Response: *The need for power is considered to be outside the scope of license renewal (10 CFR 51.95 (c)(2)). The purpose and need for the proposed action (renewal of an operating license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and where authorized, Federal (other than NRC) decision makers. The comments are outside the scope of the license renewal review; therefore, no changes were made to the SEIS in response to these comments.*

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A.4 Public Meeting Transcript Excerpts

Transcripts of the Afternoon Public Meeting on July 12, 2006, in Toms River, New Jersey

[Introduction by Mr. Cameron]

[Presentation by Dr. Masnik]

[Presentation by Dr. LaGory]

FACILITATOR CAMERON: Okay. Thank you, Mike. Thanks, Kirk. We have time for some questions to make sure that everybody understands the process and findings in a Draft Environmental Impact Statement.

Before we go to that, though, let me introduce our senior manager, who is with us here this afternoon. We have Mr. Frank Gillespie, who is the Director of the Division of License Renewal at this point. Thanks for being here, Frank. I think Frank may help us to answer some questions but definitely will talk to all of us later before the end of the meeting.

Are there questions that we can answer before we go to the public comment part of the meeting? Yes, sir? And if you could just introduce yourself to us, please?

MR. CREAMER: Yes. My name is Gene Creamer from the seashore Town of Belmar, New Jersey.

A question for Mike. I appreciate him explaining the license renewal process to us. I noted in the draft environmental statement at the beginning, it referenced the Atomic Energy Commission for Oyster Creek Nuclear Generating Station had issued a final Draft Environmental Impact Statement in 1974.

Could you please explain how that differs from the current path that licensing first station would go through now? It appears to me that that was an after-the-fact environmental impact statement? In other words, the plant was already in operation by 1974.

FACILITATOR CAMERON: Mike, do you get the gist of the question?

DR. MASNIK: Yes.

FACILITATOR CAMERON: Okay.

DR. MASNIK: It's actually a pretty obscure question. And I know the answer to it.

It turns out that the government passed the National Environmental Policy Act in 1969. And for a number of years, the old Atomic Energy Commission actually resisted doing any sort of environmental review for nuclear power plants.

And then we had a very famous decision in the courts called the Calvert Cliffs decision, which required the Atomic Energy Commission to do environmental assessments for nuclear power plants. That was an important decision because it essentially established a policy of providing these EISes for each of the plants.

Well, since Oyster Creek was built in and began commercial operation in 1969, it predated that. And there was a decision made at the Atomic Energy Commission and its successor, the NRC, to go back and do environmental impact statements on all the plants that had current licenses and that were operating.

That's certainly not going to happen today. If an applicant came in to build a new power plant, the environmental assessment would be done in advance of any construction activity.

FACILITATOR CAMERON: And, Gene, does that answer your question?

MR. CREAMER: That brings another question as to whether that was -- number one, I guess the first question I have is, the NRC with their so-called issuance on renewals for Generic Environmental Impact Statements, which is what you're referencing here today also, is that valid, number one?

In other words, to date, the only environmental impact statement that has been performed by a Federal agency for the current operating plant was an after-the-fact environmental impact statement.

I find it very hard to believe that a Federal agency was going to, with an after-the-fact environmental impact statement, come to a conclusion that its issuance or action to issue a permit was incorrect. Am I correct?

DR. MASNIK: Well, I mean, I have looked at that 1974 final environmental impact statement. And for the state of the art of the science at the time, I think it was a good effort and a reasonable assessment of what the impacts might be from operation of that plant.

Now, to say that we were 100 percent accurate on all the issues over the 40-year life span, it's probably not correct. But I think it was a good assessment. And I think the assessment we're doing now is much better.

Appendix A

We have essentially 30 years of experience in predicting what the impacts might be from operating nuclear power plants. And I think that, you know, we have a pretty good assessment here as to what might happen if this plant were to operate for another 20 years.

FACILITATOR CAMERON: Okay. Thank you, Gene. Thank you.

Let's go to this gentleman. And then we'll go over there. Yes, sir?

MR. RUBIN: My name is Isadore Rubin. I'm a resident of Pine Beach, which is in Ocean County.

My question deals with the cooling tower. A natural draft tower does not require fans. Why did you consider the mechanical tower, which does require fans and, therefore, uses more energy? That's the first question.

The second question I have is related to the salt. All cooling towers will give you some mechanical carryover through the air or more part overflow.

My question is this, this is located near a very big ocean with a lot of salt in it. And the wind is blowing salt there all the time. Is there some significant difference between what we're going to get out of these towers and especially out of the natural draft towers?

Those are my two questions. Thank you.

FACILITATOR CAMERON: Thanks, Mr. Rubin. Kirk, do you want to? Mike, do you want to answer?

DR. MASNIK: Well, I could start, yes. First of all, it's a good question because obviously there are two different types of towers. There's mechanical draft, which are these low towers, and the natural draft, which are the ones that are, you know, anywhere from four to five hundred feet high.

We asked the licensee, "Okay. In a request for additional information, what would you propose if you went to a closed cycle cooling system?" And that's the design that they came in with in their response to our request for additional information. So that's what we evaluated.

Now, to talk a little bit about the differences, you know, certainly if you put a 530-foot tower there, I mean, there would be quite a visual intrusion on the skyline. And I think that may have gone into some of the decisions on the part of the licensee.

There's also a question of costs between the two different types. So there are a number of different reasons. And they chose the natural draft. And that's the one we evaluated.

As far as the salt issue, you're correct in that most plants -- and that's where our concern is, primarily vegetation. Most plants are relatively salt-tolerant close to the shore.

However, we really have very limited experience with saltwater towers in this country. There are a number worldwide. But the concentrations of salt that we see at other towers on freshwater or even brackish water are much lower. This is very close to ocean water in salinity levels. So the amount of salt coming from the tower would be greater than we would experience at any other facility.

The plants that are salt-tolerant would likely be not affected, but you have to understand when people move into an area, they want to start planting plants that they're familiar with and they may not necessarily be as salt-tolerant.

The additional salt that could result from the operation of these towers could affect the local vegetation.

FACILITATOR CAMERON: And, Mike, Mr. Rubin asked a question about salt, but I think that also inherent there was a comment in terms of what the draft EIS says about the effects of salt. And I take it that that is something that we're going to have evaluated or going to evaluate?

DR. MASNIK: Well, we did evaluate it to some extent, but, you know, we certainly can look into it.

FACILITATOR CAMERON: Okay. Thanks, Mr. Rubin.

DR. MASNIK: The only other thing I would say is that the deposition from a saltwater natural draft tower would be over a larger area because you're starting up higher. So with the natural draft [sic, mechanical draft implied], which would be down lower, the salt deposition might necessarily be not as spread out. So there are a lot of factors on evaluating this sort of thing.

FACILITATOR CAMERON: Okay. Thank you. We're going to go back here.

MR. ALLISON: My name is Tom Allison. I'm a resident of Island Heights, just down the road here.

On the slide you had on safety improvements that are apparently not required for relicensing, I guess I would like to know -- I mean, that plant is of the Three Mile Island era.

Have there been improvements to deal with what happened at Three Mile Island or have these improvements not been done? Is it the way it always was? And this is the fundamental plant operation. The reactor shut down and responds. You avoid melting the core and things like that.

Appendix A

But the plant could be relicensing without, according to the slide unless I misunderstood it, safety improvements?

FACILITATOR CAMERON: Back again. Bob, there are two issues here. One concerns the SAMAs that were not related to license renewal and their cost-benefit.

Related to that question, though, Mr. Allison asked, are all the safety improvements that have occurred since TMI and whether those have been incorporated into operating plants, such as Oyster Creek?

I mean, there's a difference between the SAMAs and some of his concerns. And if you could just try to tie that together for us?

MR. PALLA: Okay. Let me try to keep it simple. There were many changes made after Three Mile Island. Three Mile Island was a pressurized water reactor. Oyster Creek is a boiling water reactor, but, nevertheless, following Three Mile Island, a large number of improvements were identified for all of the operating plants.

These have all been implemented. And the risks that exist after implementation of these improvements are kind of the starting point for the severe accident mitigation alternative analysis here.

Basically, following Three Mile Island, the risk was further reduced. There was a study called the individual plant examination that occurred in the 1990 time period. It used probabilistic risk assessment techniques to further assess the level of risk at operating plants.

All operating plants were required to perform these individual plant examinations. Those examinations looked at both internally initiated events and external events, such as fires within the plant and seismic events.

Those studies confirmed that the level of risk was acceptably small to meet the Commission's safety goals. And also, these studies also, for Oyster Creek included, resulted in the identification of additional changes that were made subsequent to the completion of that study. And these probabilistic risk assessment studies have continued to be maintained by licensees and updated periodically. We use the study for our SAMA analysis that's based on a 2004 version of the risk assessment study.

Now let me get to the question about the 15 or so SAMAs that you saw on the slide there. It said there were 15 potentially cost-beneficial improvements identified.

FACILITATOR CAMERON: Tom, we're going to have to get you on the record, too. But let's let Bob finish his answer. And we'll see if you have a follow-up.

MR. PALLA: Well, the 15 improvements are not required as a condition of license renewal, but that's not to say that they are not going to be done. And now at the point at which we wrote our evaluation, we did not know at that point what the licensee intended to do with those improvements, but subsequently, and I guess we should consider including this in the updated, the final version of the supplement, the licensees indicated that a number of these improvements are related to hardware changes. Four of them would fall into that category. And then a large number dealt with procedural changes.

Licensees indicated that the hardware changes -- they basically identified a subset of four hardware changes, that if implemented rendered all of the other potentially cost-beneficial analyses in the baseline case to be non-cost-beneficial.

So what I am trying to say is if you carefully select the improvements, you don't have to implement every single one of them to get the risk reduction because some of them give you the same benefits as some of the other ones.

So the four that have been identified as hardware fixes are being further evaluated for implementation. And then there is a number of procedural changes, on the order of like 15 procedural changes, that were not actually identified as cost-beneficial. The licensees indicated that these will be implemented as well at the time that the procedures are coming up for revision, according to the normal schedule for that.

FACILITATOR CAMERON: Okay.

MR. PALLA: So they're going to be making the hardware changes, and they will be making a series of procedural changes.

FACILITATOR CAMERON: Okay.

MR. PALLA: I'm sorry for the complicated answer.

FACILITATOR CAMERON: But that's good. We are going to update the document to reflect that. Is that correct? We might?

MR. PALLA: Yes.

FACILITATOR CAMERON: Okay. All right. A quick follow-up, please.

MR. ALLISON: How do you define cost-beneficial?

MR. PALLA: Okay. There's an existing level of risk, as provided by the probabilistic risk assessment study. If you want to consider an additional change to the plant, you would take the

Appendix A

risk study. You would modify the analysis to reflect what that change does in terms of the core damage frequency and what the change does in terms of the off-site releases from the plant.

So you basically translate a potential improvement into a change in, a reduction, in core damage frequency, a reduction in population dose. And there is a handbook, so-called handbook, for regulatory analysis that's used to convert these reductions in core damage frequency and reductions in population dose into dollars.

So you basically assess a dollar benefit to the change. And then you compare it with an implementation cost. So if the implementation cost is greater than the benefit, the dollar benefit, it would not be cost-beneficial. And if the dollar benefit is greater than the implementation costs, it is cost-beneficial.

FACILITATOR CAMERON: Okay. Thanks, And, Bob, if you could talk to Mr. Allison after the meeting perhaps with more information on that? And I guess I would just make that point generally.

We're going to go for three more questions. And then we'll get on with the comments. But if you do have questions or you need an elaboration, the NRC staff will be here after the meeting because we really want to get to talk to you. We really want to get out to listen to your comments.

And I know -- is it Barbara? You're Joan. I'm sorry.

MS. RUBIN: Joan. That's okay. My name is Joan Rubin.

And in view of the fact that you said the preliminary findings show that the environmental impact on the Barnegat Bay, the aquatic environment, would be small, how can you possibly determine the quantifiable impacts of Oyster Creek on Barnegat Bay if there has been no complete survey of aquatic marine life since 1975 to about 1977, 30 years ago, with the possible exception of 2 small studies in the early '80s?

The NRC certainly in order to give a meaningful impact statement has to compare what is there now with what has been. And they should certainly ask Exelon to perform a complete census of the aquatic life of the Bay. Without it, as I said, there can be no meaningful impact statement.

Maybe you can clarify this for me.

FACILITATOR CAMERON: Thank you, Mrs. Rubin. Michael?

DR. MASNIK: That's a very good question. We devoted a lot of the discussion in the aquatic section to this question.

There were a number of studies that were done in the late '70s and early '80s in the bay. And those studies were summarized in a 316(a) and 316(b) determination demonstration that was submitted to the state.

Subsequent to that, the State actually hired a private consultant to look at the results of this. And they came to the conclusion that the plant was having no effect, no serious effect, on the bay.

Obviously the operation of the plant does result in mortality of impingement due to impingement/entrainment. And occasionally over time we have had some instances where shutdown of the plant or unusual operating conditions of the plant have resulted in some fish kills.

Nevertheless, the State seems satisfied that the plant was not having an effect, that the plant did make some modifications. They've put in a fish return system to further reduce the impact. And the plant has operated since that time.

The licensee has instituted within the last year a study within the confines of the site to look at losses associated with impingement and entrainment and has found, at least preliminarily, although the data is not published, that the losses associated with the plant are very similar to what they found back in the late '70s and early '80s.

So based on the fact that we don't see any real significant changes in the plant operation, admittedly there's not a whole lot of data on the fisheries within the bay. But the fact that the plant doesn't seem to be taking organisms in different proportions and in different amounts very differently than back then, it's our conclusion that things haven't changed and the plant is still not having a significant impact on the aquatic environment.

FACILITATOR CAMERON: Okay. Thank you. Thank you, Mike.

And I think we're going to hear from Joan later in the meeting with a comment. And she may raise that issue.

Yes, ma'am?

MS. DeMARZO: My name is Jane DeMarzo from Barnegat, New Jersey. And I believe I will direct this to Mr. LaGory.

You say that your analytical approach for the Generic Environmental Impact Statement, you have two categories, a category 1 and a category 2, and that your impact levels are defined as small, moderate, and large.

Appendix A

I would like to know the percentages of small, moderate, and large. And when does a percentage move from small into moderate or into large?

DR. LaGORY: Yes. It's not quite proportional in that way. The way it's defined is, as I had on the slide, a small impact is an impact that is either not measurable, so you couldn't go out and, for instance, measure an effect on temperature, for instance, or the effect on temperature was so small that it was not causing any change in the population. So maybe you could measure it, but it wasn't causing some noticeable effect.

So it's not quite as quantitative as you had mentioned. A moderate impact, then, is sort of a step up, where you are able to measure it. There isn't a measurable change in the target resource. Let's say we're talking about aquatic resources. The fish population was declining as a result of the thermal impact.

But then the population was dropping, let's say, ten percent. It was dropping to a lower level but, then, staying stable. That's what the NRC defined as a moderate level impact. There was an effect, but the effect was a decline, a decline to some lower but stable level.

Then the NRC defined a large impact as being one that was both measurable and caused destabilization of the resource of concern. So, again, let's use the aquatic resources as the example.

And if we're looking at heat loading, if we were having a change in the thermal regime that was causing the aquatic resource, let's say a fishery, to spiral, to continue to decline, it was eventually going to go extinct as a consequence of that. That would be considered a large impact. So it's obviously a very noticeable large change in the resource.

So the category 1 and 2 issues, the category 1 issues were all issues that were found to be small for all plants. So it's related to impact magnitude, but it's not directly so. Category 2 issues can have small, moderate, or large impacts as well as category 1, category 1 all small, but category 2 could be small, moderate, or large.

FACILITATOR CAMERON: Okay. Thank you. Thank you very much.

Ma'am, did you have a question?

MS. FINN: My name is Joan Finn, and I'm from Waretown.

F-1 | Because I live in the shadow of Oyster Creek nuclear plant, I am basically concerned with what seems to be not within the purview of the renewal of the license; that is, radiation exposure, either due to the containment system being faulty or not having been checked. And I understand that that is not within your purview for renewal.

So I would like to request that, as Representative Saxton had requested, that the National Academy of Sciences do an outside review of your review and also that the Department of Environmental Protection have some say in this renewal and not just one organization because our lives are dependent on this.

Thank you.

FACILITATOR CAMERON: Okay. Thank you, Joan. That's more of a suggestion and comment. And I think you are going to speak to us later on.

But, Mike, can you say anything about the general concern and question there?

DR. MASNIK: I guess your comment is noted relative to the National Academy of Sciences, but I do want to let you know that EPA does review our environmental impact statements. And we do get rather extensive comments from EPA on a regular basis.

FACILITATOR CAMERON: And are those EPA comments on the public record?

DR. MASNIK: Oh yes. Yes. They come in, and we docket them. They typically comment on our draft, and we respond to the comments and their suggestions in the final, just like we would with a public --

FACILITATOR CAMERON: Okay. We might want to make sure that Joan knows where to get access to those.

DR. MASNIK: Sure.

FACILITATOR CAMERON: All right. Dennis, can you just introduce yourself?

MR. ZANNONI: Dennis Zannoni, New Jersey DEP.

Is the EPA going to review this Draft Environmental Impact Statement or not? You said "typically."

DR. MASNIK: Well, you know, I can't commit to the EPA actually providing comments. I can tell you that out of the 42 plants we have reviewed, probably 40 we have received comments from EPA.

MR. ZANNONI: Thank you.

DR. MASNIK: And I suspect we will in this case as well.

Appendix A

FACILITATOR CAMERON: But in terms also of Dennis' question, there's no uncertainty in the fact that we submit all of the EISes, draft, to EPA. Is that correct?

DR. MASNIK: Oh, absolutely.

FACILITATOR CAMERON: Okay.

DR. MASNIK: I mean, we have already sent a copy to their regional office and requested comments.

FACILITATOR CAMERON: All right. Did you have a question or did you have a comment that you want to make? Because I think we're ready to move on. Okay.

Thank you for those questions. Please avail yourself of the NRC staff after the meeting to ask further questions, get more clarification. We do have a number of people who want to comment this afternoon. And I want to get to that part of the meeting.

And, as I said at the beginning, I am asking you to follow a five-minute guideline in your comments. There's flexibility there, but I do want to make sure that we get to everybody today.

I guess, as a matter of fact, we're going to go to our first commenter. Joan, I think that that is you if you would like to come up and just continue, give us your comments.

Are you Joan Finn? Yes, Joan Finn. And we're going to go to the other Joan, too. And there may be more Joans, but this is Joan Finn.

MS. FINN: Thank you.

MS. FINN: I'm a recent resident at Waretown and hesitated to move there for one reason: nuclear power plant. And I want very much not to be afraid.

So I am here very informally speaking as a citizen and not a member of a group, but my concern after reading the articles in the Asbury Park Press, if anybody is here is from the press, I want to thank you for those series because they highlighted many of the issues that I am concerned about, the most important of which is that the containment system, which was supposed repaired about ten years ago, has not been repaired or looked at since then.

Why AmerGen refused to have a second or third party look at that containment system I don't know. I would like to have an answer to that and why the cooling system that the Environmental Protection Agency required later on did not have to be done. That was a couple of years ago. They said it would not be financially feasible. And that was not explained either.

F-3

So I guess my biggest concerns are maybe not with NRC -- I don't know -- but with AmerGen and, again, with the renewal without questions being answered.

I read some of the comments in the paper that I picked up. A doctor had said that the radiation effect on children in the area, on the children's teeth in the area, was a whole lot higher in the areas around nuclear power plants.

So what about that? Have you addressed that? Is that in the purview of licensing or does the idea of radiation in the environment not affect you if you're not living here or in the shadow of another nuclear power plant? That's a major concern I have, not just for me but for people living in the area of any nuclear power plant.

F-4

And the second is a question I have. How much of the energy generated by Oyster Creek is benefitting the people in the area where Oyster Creek is situated? Do we in Ocean County have any of that energy? Do we benefit from any of that energy? And to what extent have those alternate plans really been evaluated by the Environmental Protection Agency as well as NRC?

F-5

F-6

So I have more questions than answers. And thank you for listening.

FACILITATOR CAMERON: Okay. Thank you, Joan. We are going to talk to you specifically about those issues after the meeting. And I know we are going to hear more about the radiation issue that you raised from one of our commenters further down the line. Thank you very much.

Ann Miles? Is Ann here? Hi, Ann. Would you like to come up and comment? She stole your thunder? Okay. You concur in those? You have the same concerns, then? All right. Thank you, Ann.

Mr. Cervasio? Mr. Cervasio? How about right up in front so we can all see you. Thank you very much.

MR. CERVASIO: Okay. Good. Thank you.

H-1 My name is Tom Cervasio, Chairman, EnviroWatch. There was a very interesting article in the Asbury Park Press, the Asbury Park Press dated November the 17th, year 2000. And it says, in effect, the tests offered meltdown in the spent fuel pool of a nuclear power plant because failed radiation-induced cancer in thousands of people, as far as 500 miles from the site, according to a U.S. Nuclear Regulatory Commission study, according to a U.S. Nuclear Regulatory Commission study.

Appendix A

The analysis of spent fuel pool meltdown also states that millions of people within a 500-mile zone might have to be evacuated for periods ranging from 30 days to one year and that people living within 10 miles of a nuclear plant might never be able to return to their homes.

It also states the potential for prompt fatalities from radiation poisoning that would occur in areas close to the plant, the plant site, where emitting radioactive particles would be expected to fall.

The extent of possible radiation damage described in the NRC documents is far more severe than anything that federal officials have disclosed in public forums or written statements.

The agency assessments are contained in a special report prepared in October 2000 by experts within the NRC and the Sandia National Laboratories in Albuquerque, New Mexico.

H-2 The report was designed as an official NRC planning regulation in February 2001. A copy of the report was obtained by the Journal News. That's a New York paper.

The report provides the basis for any future NRC regulations on evacuation needs, safety requirements, and insurance that compares the possible damage caused by a spent fuel pool meltdown with that of a meltdown in a fully operational nuclear reactor.

It was developed to show the NRC what types of problems could occur in spent fuel pools when nuclear plants are shut down, at which point the new fuel rods would be placed in the pools and how long they might pose a danger from meltdown and fire.

The potential spread contamination cited in the report far exceeds the ten-mile zone the nation's nuclear plants currently use in developing emergency evacuation plans.

NRC officials said the evacuation plans are intended to deal only with short-term radiation poisoning, which is not likely to occur outside of the ten-mile zone.

H-3 The report was pulled from the NRC public database following the September 11th, 2001 terrorist attack because agency spokesman Neil Sheehan said if a terrorist decided to attack any plant in the United States, not just at Indian Point; that is, in formulation about which fatalities it could cause, the exact knowledge of that could be very advantageous to them.

The information was returned to the database in April. However, because it is an official regulation governing spent fuel operations and must be accessible to plant operators, I wonder if it is accessible to the public.

H-4 The report states that the analysis did not base their findings on events due to sabotage. No established method exists for estimating the likelihood of a sabotage. Nor is there a method for analyzing the effect of security provisions on that likelihood. Thank you.

Instead, analysis examined various accident scenarios ranging from worker mishaps to plane crashes into spent fuel pools, buildings. The report concluded that although the probability of such accidents is extremely low, the effects of meltdown would be enormous.

H-5

I have here a letter from Congressman Saxton, James Saxton. And it says, in effect, "Like you, I have concerns about the safety and security of the plant. With this in mind, I have introduced H.R. 966, a bill that would require the National Academy of Sciences to conduct an independent assessment of safety and security issues prior to the NRC granting relicensing approval.

H-6

"The bill would also require the Commission to evaluate the facility with respect to health risks, vulnerability to terrorist attacks, evacuation plans, population increases, ability to store nuclear waste, and the impact of nuclear accident are during the relicensing process. The bill is currently pending before the House Committee of Energy and Commerce."

I wonder if this plan was made available to the state Evacuation Committee, which I think would be very, very important. I am here to try to get a copy of this plan because I think it is of great interest to all the people.

Thank you very much.

FACILITATOR CAMERON: Thank you, Tom. We're going to go to Tom Allison.

MR. ALLISON: I would like to read you a brief e-mail that I sent to Governor Corzine which expresses my concerns about what's going on.

"Governor Corzine, I met you briefly in Island Heights last summer, a place I love dearly, as does my wife, whom I met there. I have for the past 26 years operated a New Jersey manufacturing and engineering business in Moorestown in Riverside, New Jersey, started by my father and not in any way connected to nuclear power or Oyster Creek.

"Island Heights and especially Moorestown, Riverside also, in fact, much of New Jersey is facing a horrible and increasing risk from some nuclear science and engineering issues related to Oyster Creek.

C-1

"In the '60s and '70s, I was an engineer working on naval and utility nuclear power plant design projects. The Three Mile Island incident happened while I was working at Burns and Roe in Oradell, New Jersey.

C-2

"The reactor containment building, which I believe saved the populous from a deadly radioactive release, was designed by a Burns and Roe engineer named Bob Palm, whom I work closely with.

Appendix A

"The TMI incident itself was essentially caused by -- and this is a technical term -- cover my ass plant management. An operator moves to first operate the plant with a broken steam generator backup feed pump, then to turn off emergency core cooling after the reactor overheated due to failure of the main feed pump.

C-3 "The TMI event caused the demise of the U.S. nuclear power plant industry for quite a while. But, as I learned shortly after it occurred, the public's nuclear radiation risk is and continues to become worse as a result. Little, if any, new and important safety-related development is occurring. I hope I am wrong about that statement.

"In 1979, the last Burns and Roe project I worked on was a proposal for the Yucca Flats, Yucca Mountain, Nevada safe storage facility for spent reactor fuel, a very large supply, which is sitting around in metal boxes" -- I may be incorrect about that; they are these things with the concrete on the outside of them -- "at Oyster Creek outside of any reactor containment building.

C-4 "I was told at the time of TMI that the reactor containment building, at least there, was designed to take an aircraft hit from a 727, Boeing 727. Of course, the ones that did the World Trade Center were much bigger aircraft. Will a containment building take that? I don't know.

C-5 Spent fuel contains dangerous radioactive stuff, some of which will take about 250,000 years to completely decay. I have heard -- well, let me continue. Twenty-six years after the project's 1979 inception, the geologically stable Yucca Mountain storage site is still empty and I think under some construction. And 26 more years worth of spent fuel sits outside Oyster Creek's containment in our lovely and heavily populated state.

Many of Europe's reactors have no containment buildings. And the Chernobyl disaster gave us an example of what can happen when a powered reactor fails catastrophically.

I was interviewing a potential employee, who came from the Ukraine. His description of Chernobyl was extremely upsetting, particularly the thyroid cancer story and the contaminated land story.

C-6 Given our state's population and our precious shore communities adjacent to Oyster Creek, we really need to do something effective now concerning spent fuel and perhaps safety.

Thank you.

FACILITATOR CAMERON: Okay. Thank you, Tom Allison.

And we're going to go to Mike Kennish.

MR. KENNISH: My name's Mike Kennish. I am a research professor at Rutgers University. I have a long history of research experience in coastal waters of New Jersey, including Barnegat Bay, Little Egg Harbor Estuary.

I just want to mention one thing. I've been quoted a couple of times in the report. My main reason for being here was the quotes that were in that report, which indicate -- well, I can read one in particular. It states that "Despite large numbers of eggs, larvae, and small life forms at Barnegat Bay, organisms lost via impact passage at the OCNGS, these losses have not resulted in technical impacts on biotic communities in Barnegat Bay."

I want to emphasize that this publication that is in reference to, which I have edited and published after extensive peer review, among other things I have done in the bay, is in reference to a review of other documents, and of old material that goes back to 1975-77, 316(a) and (b) demonstration reports as well as the BURSAR report. I think it was '88 and '89.

And so that is not an assessment of what I see today in terms of looking at the entire picture, the entire window from 1969 until today. And largely the report, the NRC's report, related to aquatic impacts, they have done the best job they could do with it considering the material they had to deal with, but it's relatively irrelevant because if you don't take into account impingement and entrainment and sampling at the same time in an assessed water body, in this case a central part of Barnegat Bay, the information is it's impossible to draw a proper assessment.

If you take the variation of a population in Barnegat Bay of any organism, at any one time, it could be two to three hundred percent. And to take a comparison of a population of how many organisms are being impinged or entrained at one time and then say, "Thirty years or 25 years later, you're comparing these numbers," that's also irrelevant because it doesn't take into account these fluctuations in the natural populations in the water body in the adult form.

When they did these studies back in 1975, they did it. The only time it was ever relevant was when they did the work in 1975 and '77, when they actually had impingement and entrainment numbers and they did population surveys at the same time.

So you're dealing with old data, 30 years old. Today's information in that report is irrelevant. And, as it's not NRC's fault, the real problem lies with the Clean Water Act people, the EPA, and the DEP, who did not provide sufficient oversight on the parent company in terms of making sure that they did population surveys routinely and cyclical or periodic in the bay.

With a variation of two to three hundred percent in populations at any one time, you really should be doing population surveys almost every year. And considering the cost of that, I understand, but you should at least do it every five years.

Appendix A

It was not done for 30 years. And someone dropped the ball completely. And, in fact, if you have a parent company that espouses that they are environmentally friendly and concerned about the environment of the estuary, then it would be incumbent upon the company's own scientists.

Some of whom have been there for 30 years themselves know better that they could have been doing population surveys periodically. That would have made the NRC's job much more easy to comprehend, to deal with and provide you with the necessary and accurate information that you need.

There are problematic areas. For example, the shellfish beds of Barnegat Bay have been on decline. That was a species which was a representative important species back in 1975 and '77. And it was not followed through.

If you want to get into the statement to me that there are no observable impacts, well, one could contend that there is a correlation or association with that because hard clams have been on decline in the bay, in the central bay, for some time. There is also some indication that winter flounder populations are negatively impacted in the central bay as well.

I am not saying all of these things are due to the plant because I can't as a scientist and I won't do that. I want to be able to take data and to do data as a scientist and assess things as a scientist and come up with an effective proper conclusion.

This can't be done the way it has been done in this process over the 30-year period. The information in the report is not accurate. It can't be accurate when you don't have population surveys that are conducted concurrently with impingement and entrainment studies.

And, by the way, they are conducting impingement and entrainment studies today right now at the power plant, which, again, are irrelevant. I'll repeat that: irrelevant unless they do surveys in the bay, which they're not doing.

And to be able to go back and say, "Well, we have 10^{13} power of polychaete worm being cropped by the power plant today, and we had 10^{12} back in 1977. Therefore, everything seems to be okay" can't be done that way, not scientifically.

You send that report out to my colleagues at Penn State and other universities. It would be rejected so quickly. It would be rejected very quickly. And that's part of the problem.

I-2 | You really need to take this information. Someone mentioned the Academy of Sciences. You have to have an outside, independent body doing assessment on things. You can't keep things locked into a state agency or a federal agency. You need to have an independent body that

has no buy-in, no monetary reason of interest, namely an interest in doing it for scientific purposes.

I certainly fall into that category. I have no interest in whether a company is making money or -- you know, I would like to help the NRC and other government agency bodies to do their job. I'll do it for nothing to do it right.

I mean, I live in Ocean County myself. So if there's any reason for me to be concerned about all of this, it's that I live in the county, too, and because I do all kinds of oceanography stuff in New Jersey and elsewhere. So I have to be near the ocean pretty much.

But, again, I have a lot I could talk about. I could answer a lot of questions. I want to work with the DEP, quite frankly, Susan, and offer my services free -- I'll repeat that: free of my time and services -- to develop a way that we should be addressing these problems at the power plant and in the bay.

You have to do population studies and community studies in the estuary. If you don't do that, the information is of no value. It's essentially no value. In fact, the power plant, it would be my recommendation that they do it because if you just look at impingement and entrainment data at the power plant, those numbers indicate that you have an absolute number of organisms that are dying because of the plant. They're very large.

And so someone would say, "Well, my God. You have all these organisms dying." Well, you really need to take a study of the bay population and because those numbers may really not be translating into a real impact, as has been said by Mike and so on and his colleagues.

So it would be to their advantage to do a population survey in the bay because if it can be demonstrated that the adult populations out there are not really being adversely affected, then you have something. But to play this guessing game or not really wanting to do population surveys out there and just using these numbers at the plant, it actually makes it look even worse because it looks like these are an absolute number of organisms that are dying, you know, a quarter of a million blue crabs a year at the intake screens, for example.

What does that mean in terms of the total population of crabs in the bay? Maybe it's one percent. But for a crab potter out there who says, "Oh, my God, 250,000?" the guy is going to go bonkers, you know.

So we really need to really do things correctly, do it scientifically sound. That is not being done right now. And, again, I'm willing. I'm offering my services to help out, help out the company and help out the DEP and EPA. Part of the problem is the EPA itself has rescinded some of its obligations in terms of not enforcing or having the power companies do population surveys.

I-3

Appendix A

So the companies themselves seem to respond mostly to pressure from outside the government agencies. They respond to pressure from a government agency. They're not doing things on their own volition in my opinion.

If you go back into time, the response mainly is to a response to some requirement and after a permit violation or whatever, rather than someone taking the proactive position ahead of time to do something about it so that you remediate the problem before it even occurs.

I-4

And, finally, one final point, which I'm really opposed to, is this giving someone an alternate remediation pathway. If you're impacting weakfish in Delaware Bay, as the Salem plant was, you don't go into a tidal marsh and try to remediate a tidal marsh, where weakfish don't hang out. Okay? And that stuff is nonsense.

These companies should be -- again, in this case, it bothers me. The companies, if you're using a natural resource, like seawater or an estuary, you should be addressing the effect that you're having on, directly on, the exact problem. Don't take it to some other habitat. And that is true in Barnegat Bay.

There's nothing wrong with our tidal marshes in Barnegat Bay. We should be doing work in the bay itself, in the center of the bay. The communities are degraded out there.

I'm telling you, and I could write three books about this. Okay? And I'm letting you know I've done a lot of work out there. That bay is degraded. And we need to do something about it.

And putting a fishing reef about three miles off or Barnegat Inlet is not the way to do it. Okay? It's not the way to do it. You put the funds in the Barnegat Bay, not into some reef three miles off the Barnegat Inlet. That does not have anything to do with the health of Barnegat Bay.

FACILITATOR CAMERON: Okay. Thank you. Thank you much.

(Applause.)

FACILITATOR CAMERON: Gene, Gene Creamer?

MR. CREAMER: Gene Creamer from Belmar again. By the way, I'm glad -- I don't have formal prepared comments, but I do have some notes. I'm glad that you did provide copies of the draft report. I would like to make a reference to specific sections. Otherwise this is not going to make any sense at all.

A-1

Figure 2-3 on page 2-4. It's the Oyster Creek nuclear generating station site property map. If you would just take a look at it? You will note that both Oyster Creek and the South Branch of Forked River west of the plant are delineated with dotted lines.

Well, I'll tell you what I did. I checked the USGS map plot and brought a copy of it here today. You can clearly see that both Oyster Creek and the south branch of Forked River on USGS quad map are solid blue lines.

That may not seem significant, but to an ichthyologist or people that use USGS maps as reference material, the dotted line indicates according to USGS legend an intermittent stream and one that does not carry constant flow of water. At best, this map to me is misleading.

I also noted that this map I guess was widely distributed and used for submission to other agencies to solicit comments. I'll leave it to the NRC to develop some sort of standards of integrity when it comes to using this sort of information.

Oh, I'm sorry. I guess what I'm doing is backing up away from the microphone as I speak. In brief, I'll just repeat. The site boundary map on page 2-4 uses dotted lines to delineate or to lay out the south branch of the Forked River and Oyster Creek.

A-2

I compared that map to a USGS quad map, which is the standard map that's used for showing the location of a plant and the surrounding environment. The difference between the map in the report and the USGS quad map is that the USGS quad map shows those streams as being regular streams, not intermittent streams, as shown on the map that is included in the draft report. That is my first comment.

Second comment. Section 2.1.7 in the draft report, I think it's titled "Power Transmission System." That entire section, I read through it. And it's silent with respect to the Oyster Creek nuclear generating station output power transformers, does not indicate their location, the ownership, and the responsibility of those transformers.

A-3

Just as an aside, I'm sure all the people from NRC know once you have a fault in an output power transformer, it shuts the plant down. The plant automatically has to shut down.

A lot of verbiage in that section was devoted to local distribution system and essentially a backup power supply. And the title of the section was "Power Transmission System."

The next comment I have is on section 2.2.2. And that section is titled "Water Use." If we just look at page -- it looks like 2-19. You have to excuse me, by the way. I just got new glasses yesterday. I'm having a little bit of difficulty getting accustomed to using them.

A-4

The fourth paragraph down, second line, "Information on the two production wells at Oyster Creek nuclear generating station is available in a water use registration (NJDEP 2001A), which is required for users of less than 100,000 gallons per day." That statement is incorrect.

Appendix A

The 100,000 gallons per day is a regulatory threshold. The installation of equipment, which could divert 100,000 gallons a day of the waters of the State of New Jersey or more requires a permit. That permit is, I believe, covered by the Water Supply Act and is typically referred to as a water allocation permit.

If you read on in that section, you will see that it refers to two production wells. If you run the numbers for those pump rates, you will see that they both exceed 100,000 gallons per day. That's why they're regulated.

This brings up a whole fascinating issue here. Then the section goes on and describes freshwater that's used in what's referred to as a fire pond. It does not describe the pumps or the capacity of those pumps that could be used to divert the water, the fresh water, from the fire pond.

If those pumps have a capacity of diverting in excess of 100,000 gallons per day, my interpretation of New Jersey state law is that they would require a water allocation permit.

I'm not sure whether discovery is supposed to take place at these sorts of hearings, but I would like to bring this to your attention. Similarly, south branch of Forked River is a USGS quad, solid blue-delineated stream, solid blue-delineated going westerly beyond the Garden State Parkway. Its drainage area is significant.

The entire flow of the south branch of the Forked River is diverted by operation of the cooling water pumps of the Oyster Creek nuclear generating station.

I did a review of, I believe it is called, appendix E, a listing of -- I believe there is a listing of permits and approvals that the station or the owner has provided. I find no permit issued for the fire pond water, which I believe is actually Oyster Creek water, another stream. I find no permit for the diversion of water from the south branch of Forked River.

I guess my question here -- oh, the other thing I wanted to mention, the section does mention that the wells have installed meters. And the way this usually works is that the applicant -- those are totalizing flow meters -- that the applicant takes readings and supplies those readings to the NJDEP on a periodic basis. And then the DEP sends the owner an invoice to pay a bill.

I know you have used the terms "small," "moderate," "large." If you look at the millions of gallons, I think that we're talking here about diverted New Jersey state water. We may be able to get things large.

A-5 | Also, the moderate, estimated moderate, impact of the installation of a cooling tower system because of the assumption that saltwater would be used for that cooling water does not take into consider that perhaps the use of freshwater would reduce that impact.

Thank you. I'm not done with my comment. Well, I'm done with my comments here today, but I'll follow through with review of the report.

FACILITATOR CAMERON: Great. Thank you very much, Gene. It all sounds very useful. And thanks for spending the time looking through the document. We'll look forward to your comments.

We're going to go to Barbara, Barbara Bailine. Just so you can get ready, after Barbara, we are going to go to Joan Rubin and then to Ed Stroup. And this is Barbara.

MS. BAILINE: Barbara, yes. Can you hear me okay in the back? I have two questions and a comment.

I would like to feel relieved because of all the charts and the diagrams to calm my fears. However, still in my heart still pumps a little hard there.

I wanted to ask the NRC, how is it that they missed that ten-year tritium leak? I think it was called Briarwood out in Pennsylvania. And nobody caught it. The NRC certainly didn't catch it. It was a neighbor who saw a pool forming on his land and had it checked and found out it was radioactive tritium. I'm just wondering why ten years when the NRC claims they're so thorough and they missed it. That's my first question. And I would like it answered.

J-1

The other question I have is I understand that out in California, the courts ruled against the NRC and said because of the design of the plant and the vulnerability of the fuel pool, that the NRC had to take into consideration a terrorist attack, even though the NRC claims it was very minimal. But the court said, "No. It is not minimal in this day and age." So I would like that answered.

J-2

The comment I am going to make now has to do with something that happened up in Boston very recently, but I think it's apropos. A tunnel was closed up there just a couple of days ago when a huge panel fell off the roof and crushed a woman in her car driving through.

J-3

They closed up the tunnel. But what I feel is apropos is that the head of the Port Authority -- I don't know his name offhand, but he's the head of it there -- after the woman is dead, crushed to death, the tunnel is closed, he says to the press and the public, "Well, I want to assure everybody the tunnels are safe," you know, somehow that he could say that after, "Oh, my God," they had to close up the tunnel and the woman is crushed to death in her car and he says, "Don't worry about it, people. The tunnel is safe."

Okay. That is my comment. And those are the two questions I have. Thank you.

Appendix A

FACILITATOR CAMERON: Okay. Thank you, Barbara. And we will try to answer those questions. The first may be offline, but the second one may be important enough that we might want to just give an answer to that during the meeting if we have time before it closes.

We're going to go to Mr. Joe Mangano right now, Radiation and Public Health Project. Joe?

MR. MANGANO: Good afternoon. I'm sorry to those two speakers that I kind of bumped here.

Again, my name is Joseph Mangano. I am National Coordinator of a group called Radiation and Public Health Project. We are a group of scientific and health professionals that do research on health risks from nuclear weapons and nuclear reactors. We have published 22 medical journal articles and 5 books on the topic in the past 12 years.

K-1

I have some brief comments to make on the environmental impact statement that has been discussed today. Basic comment is that from the issue that our group deals with -- and that is the issue of human health -- my colleagues and I believe this report is very, very deficient, even irresponsible, even dangerous.

The reason for this is that the NRC makes a very, very large presumption. They presume that as long as emissions of radiation into the environment from Oyster Creek are below permissible limits, therefore, they can presume to be harmless. And there is no need to do any health studies or health analyses and reports such as this.

Now, I am a public health researcher. We are trained not to make presumptions like this. This is almost like presuming that if one smokes three cigarettes a day or less, let's say, this is a safe level of cigarette intake and there is no harm involved and no need to do health studies.

K-2

Well, the more professional way to go about it is to don't make any such presumption, to do the health studies, especially when we have a long history in the atomic age of presumptions of low dose being safe later found out to being the reverse, to being harmful.

Years ago, doctors did X-rays, pelvic X-rays, on women who were pregnant. Up until the 1970s, they were found to increase childhood cancer. Discontinued.

For many years, the government said that the bomb tests from Nevada did no harm to Americans. In 1997, a federal study showed that as many as 212,000 Americans suffered thyroid cancer from the tests.

For years, the government said that workers in nuclear weapons plants were not harmed. In 2000, the government reversed their policy and passed a law, agreeing to compensate cancer victims who worked in nuclear weapons plants. So we must take the same approach here with routine emissions, low dose that they are, with nuclear power plants.

A good environmental impact statement I believe should contain information on at least four items: the amount of emissions, the amount of radioactivity in the environment, the amount of radioactivity in bodies of people living near nuclear plants, and cancer rates in the local area. Our group has done considerable work on this near Oyster Creek and near other nuclear plants.

K-3

As far as the first one, emissions, go, Oyster Creek, of the 103 reactors now operating in the United States, Oyster Creek has emitted the greatest amount of airborne radioactivity, of any of the reactors, something around 77 curies, what we call iodine-131 and particulates, anything with, you know, a half-life of 8 days or more, and 5 times as much as was officially released at Three Mile Island. Okay.

K-4

Even individual chemicals, such as strontium-90, strontium-89, iodine-131, barium-140, Oyster Creek consistently ranks in the top five reactors in the United States. You can go right on the NRC Web site and find out the data for the last couple of years.

Number two, environmental radioactivity. If you go to the Web site that's run by the EPA, they have extensive data on levels of radioactivity in the environment, in the air and the water and the soil and so forth.

K-5

Water-borne radioactivity in Waretown, which is just one mile from the plant, is between 2 times and 10 times as high as that at Trenton, for example, which is 50 miles from here.

Number three, in-body levels of radiation. Until our group came along, no one had ever done any sort of a study on how much radiation was in bodies of people who live near nuclear power plants. Okay?

K-6

We began in 1998 something called the baby tooth study or the tooth fairy study. It is not a new idea. It has been done in the past before. A group of scientists from St. Louis in the '50s and '60s did a study of strontium-90 in baby teeth that resulted from bomb test fallout. There have been studies of strontium-90 after Chernobyl. There's another one of near the Sellafield plant in England.

Our study has looked at almost 5,000 teeth. Over 600 are from New Jersey. We have found a couple of alarming things. Near every plant, including Oyster Creek, number one, from the late '80s to the late '90s, the average strontium-90 in baby teeth of local children has increased about 50 percent.

Now, one of the handouts in the back is a fact sheet on the baby tooth study, which says that the study has been discredited. Well, I beg to differ. We have published articles in five different medical journals. That has gotten the peer review stamp of approval from experts, who say the study is worthy of publication.

Appendix A

The contention of people who oppose the study is that the strontium-90 that comes out of the reactors that gets into people's body, it's all leftover bomb test fallout from the '50s and '60s. Well, if that were the case, why did we find such a sharp increase near Oyster Creek, near Limerick, near Indian Point, near Millstone, near the reactors in Florida, and so forth?

K-7 The final point in cancer. You can't in my opinion and my colleagues' opinion recommend that a reactor operate for another 20 years without doing a good report card of what the health status and health changes have been in the local area in the first 37 years this plant has been running.

The statistics, we certainly haven't done a comprehensive review, but we have certainly gone through childhood cancer statistics. And they're quite poor.

Ocean and Monmouth Counties for years have been much higher than state or national, about 25 percent higher. The cancer death rate among children in these 2 counties is something like 43 percent higher in the last decade.

You all well know that in about a decade ago, there was a large, the revelation of a large, outbreak of childhood cancer in Toms River, which is right here and close to Oyster Creek.

Now, the State Health Department looked for something like 6 years and spent \$10 million, found no environmental connections, but this shouldn't end it. When we have this many great concerns here, we should not be giving carte blanche or this reactor to operate another 20 years.

K-8 So I say, in conclusion, I urge the NRC, number one, to commission independent health studies on these topics; number two, to not take any position on reactor extension until these issues have been completely examined and completely resolved because there is nothing more important than human health.

Thank you for your time.

(Applause.)

FACILITATOR CAMERON: Thank you, Joe, for coming down. And, as Joe pointed out, he and his group have been involved in this for a long time. And there's been an extensive dialogue with the NRC on this. Joe mentioned that the NRC has done an assessment. And, from his remarks, obviously he disagrees with it. But it is back on the table for those of you who want to read that piece.

Now we're going to go back to -- is it Joan? -- Joan Rubin. Thank you, Joan.

MS. RUBIN: Hello. Thank you. Thank you. I hope that's good. Okay.

Well, I came here today. I am definitely opposed to the relicensing of Oyster Creek, but I came here wanting to hear what was being said. And I have to say that I think now that I evaluate that report from my limited background. But I have to say that I think it's junk science.

D-1

I think that these conclusions of the NRC are based on all data, a static attitude towards the data that does exist, an assumption that if things haven't gotten worse, they're all right and in general a very negative, not caring attitude about public welfare.

D-2

First of all, let's just talk about something that Joe Mangano said, I guess, the radioactive emissions, which are put out, which is okay with the NRC. However, recently the National Academy of Sciences in their BEIR VII, which is an acronym, said that no amount of radiation is acceptable. Any amount is dangerous.

D-3

And we know that we see around us the incidence of cancer, for instance, is just on the increase. But that is obviously anecdotal. I haven't done a scientific study. Why hasn't the NRC changed its category 1 evaluation? In other words, this is small, a small risk.

Then we have the idea of Barnegat Bay corruption. Now, that was addressed by Professor Kennish. And there's really nothing I could add. He's an expert. But the point is that the NRC relies on data 30 years old. That's unacceptable. And this is what we are supposed to swallow as the public.

D-4

Another thing, I am at a loss to understand how the substitution of such passive energy sources as wind or solar power could have a moderate or large effect as compared to the small effect of the plant.

D-5

I mean, common sense tells you that perhaps there would be some initial disruption of the environment in the building of these energy sources, but ultimately it is bound to have a small. Sure, if you're going to compare it with an unclean coal plant, I mean, your worst possible case, just like the cooling towers are the outdated type of cooling power for a nuclear plant. They should be natural draft and not mechanical or forced draft. I mean, if you're going to compare things like that, that is unforgivable in my opinion.

The Oyster Creek contributes a maximum of 650 megawatts. And we all know that that is presenting a huge risk to Ocean County and to the rest of the state, certainly the adjoining counties, for a very small amount of electricity. I don't see a cost-benefit or a risk-benefit assessment giving us anything but very negative results on that.

D-6

You know Barbara mentioned the tritium problem. That's only beginning the contamination of our groundwater by tritium. It happens to be able to spread very easily, and that hasn't even been considered.

D-7

Appendix A

D-8 | The fuel pool. Sure, if everything is working all right and it's covered, it's not presenting a radioactive hazard. However, certainly environmentally it would be a disaster of the most catastrophic dimensions if anything were to go wrong there.

D-9 | I just close by saying that I am very disappointed, more than disappointed. I feel that they are marketing a bill of goods that is detrimental to our welfare here in Ocean County and the State of New Jersey.

Thank you.

(Applause.)

FACILITATOR CAMERON: Okay. Thank you, Joan.

We're going to go to John Rayment next and then to Ed Stroup and then to Edith Gbur. This is John Rayment.

MR. RAYMENT: Thanks.

As the gentleman said, I'm John Rayment. I'm an employee of Oyster Creek. I've been there for 25 years as a radiation protection technician. I'm also a member of the International Brotherhood of Electrical Workers, a group that was formed initially to watch out for the safety of linemen. So we're very interested in safety.

L-1 | I'm very interested in not only nuclear safety but industrial safety at the plant. I'm just here to tell you that I believe that Oyster Creek should get a license extension.

L-2 | The members of IBEW local 1289 are at the plant 24 hours a day 7 days a week. We don't see old data. We see data that is happening right now every day. And I can tell you that the plant is run safe, and we are committed to making sure it continues to run safe.

I live in Barnegat, which is less than five miles away from Oyster Creek. My wife and my children are within five miles of the plant. So are my parents. So is my brother. And I would never compromise their safety to see the power plant continue to run.

My expertise is in radiation protection, and I can tell you that Oyster Creek is a safe plant, both radiologically and as far as the environmental is concerned.

We have the operators and the radiation protection technicians, the mechanics, who are highly trained individuals who care, first of all, about the operation of the plant and the safety of the public and the safety of our families.

Thank you.

(Applause.)

FACILITATOR CAMERON: Okay. Thank you, John.

Next we have Ed Stroup.

MR. STROUP: Thank you.

My name is Ed Stroup. I'm President of local 1289. I represent about 230 bargaining unit members at Oyster Creek. I can tell you you are going to hear a common theme between what John just told you and I am going to say.

Both John's remarks and my remarks were prepared independently. Neither of us talked to the other one about what we were going to say, but what we do know is Oyster Creek and the people that work there. And I think that you're going to see a common theme between the two based on our firsthand knowledge of the plant and the people who work there.

Our members are highly skilled and highly trained, as is everyone at Oyster Creek: union, management, and security. Each is a skilled professional in their field. I can assure you they all take their responsibility seriously and work hard to ensure the safety of the public and the environment all day every day.

M-1

It is my belief that one of the great injustices in this whole relicensing process is that these dedicated professionals along with the NRC and the state police are treated with contempt and referred to basically as incompetent by some whose only agenda is to close Oyster Creek and all nuclear plants.

Our members live and work in the local community. Their families live close to the plant, and their children go to school here. Our lives and those we love are local to Oyster Creek along with the public that we serve.

We would never compromise our principles or the safety of the plant and the public. Oyster Creek produces enough energy to power 600,000 and adds \$52 million a year to the local economy.

M-2

We contributed \$202,000 to United Way last year and over half a million over the last 3 years. We contributed \$80,000 last year to the New Jersey DEP Fish and Wildlife Department and \$5,000 to the Audubon Society to help clean water fowl affected by the Delaware River oil spill.

Appendix A

- M-3 | Oyster Creek sponsored and installed an artificial reef in the bay working with the New Jersey DEP. At the same time it was undertaking these environmental projects, Oyster Creek produced zero carbon emissions and avoided 7.5 million metric tons of carbon dioxide that replacement power would have produced.
- M-4 | Oyster Creek avoids carbon emissions equal to more than two million cars per year or, to put it in a different way, an amount equal to half of all the motor vehicles in New Jersey.
- M-5 | At Oyster Creek, we work hard to protect the environment, including Barnegat Bay. On a day-to-day, hour-to-hour basis, we monitor water temperatures and regularly take water samples to ensure safety.
- | We coordinate any planned load reductions or shutdowns to avoid any risks to marine life. This is a costly practice but essential to meet our commitment to the environment.
- M-6 | I can assure you our members as well as management and security are all highly trained, highly skilled professionals who take their responsibilities seriously. Their first priority is to protect the public and the environment. They ensure that Oyster Creek is a safe, clean, reliable, environmentally friendly plant all day every day.
- | It is for all these reasons and others that I urge you to relicense Oyster Creek. Thank you.
- | (Applause.)
- | FACILITATOR CAMERON: Okay. Thank you, Ed.
- | Edith Gbur was up next, and she was just here. I don't know if she left. We'll wait. Maybe she'll be back.
- | Is there a Kevin Commons here? Yes? Kevin, did you want to talk?
- | MR. COMMONS: No.
- | FACILITATOR CAMERON: Okay. Thank you, Kevin.
- | Gina Guerrazzi? And, Gina -- no. All right.
- | How about Jeff, Jeff Munyan?
- | MR. MUNYAN: No.

FACILITATOR CAMERON: All right. Oh, here comes Edith. Edith? No, she doesn't? Tonight? Okay. Edith will be back tonight.

Isadore Rubin, did you want to comment to us? Why don't you come up?

MR. RUBIN: Good afternoon. My name is Rubin. I live in Pine Beach.

I asked the question before about the cooling towers. And I received an answer that puzzles me. So I want to go back to that again.

Recently I was asked to be chaperon at a high school dance. And I was asked by one of the young ladies to dance. And I said, "Well, maybe if you play a waltz, I'll do a dance but not this hard rock."

I don't understand this thing with the cooling tower. The most efficient thing is a natural draft tower. I don't know why AmerGen asked the NRC to put in the mechanical draft, but why didn't the NRC say, "No. These are more efficient. Let's use them"? And what is the impact from them? Would they be less?

B-1

I also don't understand something else. At the present time, to get the plant to work, they have to have cooling water in the condensers. That's what they take out of the bay and put back in. In order to do that, the water comes out of the reactor at a temperature that they can't return directly to the bay.

B-2

So they have a lot more water that they pump a round and they do the loop and they put them together. They drop the temperature and put it back in the bay. If you have a cooling tower, you won't need to do any of that. And the only thing you've got to make up is essentially the evaporation.

I quickly looked at a report. It says they would reduce the water usage 70 percent. It seemed to me they have reduced it 90 percent. I understand where the 70 percent number comes from. So I think I've been given answers that really are not quite correct.

As far as the safety of the thing is concerned -- and there have been these two gentlemen just speak about their interest in maintaining the thing safe -- as a layman, I don't know where the escaped gases are vented from the existing system.

I assume that they go up that tall stack that's there. So I have had that question before, and I still have that question. Are there monitors at the top of the stack? Are there records for telling us what is coming out?

B-3

Appendix A

I think that would be useful for the average citizen and it be important for the NRC to consider that as positive proof of what they're doing or where the plant is going. And, therefore, I feel that those questions should be answered before the NRC says, "Okay. You can go ahead for another 20 years."

Thank you.

FACILITATOR CAMERON: Okay. Thank you.

Mike Masnik and Kirk will talk to you about that issue after we're done with the meeting. And I know that we're going to go to Barbara Bailine with some information hopefully or perhaps about the tritium and also about the court case in California.

That's the last speaker that we had signed up for this afternoon's session. And you know we are going to be back here tonight to open house at 6:00 and the meeting starting at 7:00. So please feel free to join us at that time.

I'm going to ask Frank Gillespie, who is the Division Director of License Renewal -- all license renewals come under Frank's watch -- to close the meeting out for us.

Frank, do you want to use this or do you want to get up there, whatever you prefer?

[Presentation by Dr. Gillespie]

Transcripts of the Evening Public Meeting on July 12, 2006, in Toms River, New Jersey

[Introduction by Mr. Cameron]

[Presentation by Dr. Masnik]

[Presentation by Dr. LaGory]

MR. CAMERON: Okay. Thank you, Mike. Thank you, Kirk.

We have time for some questions about the process or about the Draft Environmental Impact Statement. Paul.

MR. GUNTER: My name is Paul Gunter, and I'm with Nuclear Information and Resource Service.

I'm wondering if NRC can give me some insight. Just briefly on June 2nd, 2006, the Ninth Circuit Federal Appellate Court in California rendered a decision that the environmental reviews that NRC conducts with regard to all -- you know, particularly the license extensions, must consider the environmental consequences of a terrorist attack on a nuclear facility.

And I know that one of the contentions that was submitted on November 14th, 2005, by the State of New Jersey addressed exactly this issue under SAMA.

So my question is: what is NRC doing right now to reconsider and reevaluate the impact of the Ninth Circuit decision on this proceeding and other proceedings?

MR. CAMERON: Thank you, Paul.

I'm going to ask Mitzi Young of our Office of General Counsel to speak to that. Mitzi.

MS. YOUNG: Thank you, Chip.

Good evening, everyone. Paul, I hate to disagree with your interpretation of the Court's ruling, but it did not address license renewal. It addressed the assessment of environmental impacts for an independent spent fuel storage facility at Diablo Canyon. That decision is currently being considered. Whether the government will file an appeal, the time for that has been extended and decisions will be made on that until late August.

So the NRC, Department of Justice, the government in general is trying to decide how best to respond to that decision.

MR. GUNTER: Not to have a back-and-forth on this, but would you agree that the Ninth Circuit does have impact on NEPA proceedings? The NRC had previously stated that the consequences of an act of terrorism are so remote and speculative that they cannot be raised under a NEPA proceeding.

The license renewal process is governed by NEPA. So am I correct in stating that the Ninth Circuit does bear on all NEPA proceedings? At least it raises it as a precedent court decision.

MS. YOUNG: As a government attorney I'm certainly not here to advise a member of the public specifically, but, yes, the decision does question whether the exclusion for the independent spent fuel pool installation of analysis of impacts was appropriate in terms of a NEPA statement, and that's the extent of the ruling.

What the impact is for all of NRC's program is still being under consideration by the Commission and Department of Justice.

MR. CAMERON: Okay, and I guess it's a watch the space to see what the Commission, and as you phrased it, the Government, since the Department of Justice is involved, decides to do with this, and I suppose there's a whole range of possibilities that we don't even want to speculate on, but it could at one end of the spectrum possibly go there.

Appendix A

MS. YOUNG: I neglected to mention in terms of New Jersey's concern specifically -- I'm sorry -- in terms of New Jersey's concern specifically, I believe there have been filings in a number of cases before the NRC, including Oyster Creek where the proponents of the case, Mothers for Peace. Their counsel has filed with the Commission specifically a statement saying, "Please consider this as controlling precedent."

So that argument has been raised with the Commission and the Commission will have to deal with it.

MR. CAMERON: Thank you, Mitzi. Thanks, Paul.

Other questions on the process? Yes.

MR. WARREN: Yes, actually I have a question. I was wondering does the Environmental Impact Statement that you were reviewing here today cover the spent fuel pool at Oyster Creek.

DR. MASNIK: In what fashion? In other words, the document does describe the facility and state that there is a spent fuel pool.

MR. WARREN: I guess specifically in the vulnerability of the spent fuel pool to a terrorist incident or in the consequences of our problem with the spent fuel pool per se, a zirconium cladding fire, and the environmental impact that that would cause.

DR. MASNIK: No, it does not. The issue of sabotage or terrorism is outside the scope of the license renewal as I had stated during my talk. So it's not covered from the standpoint of terrorism or sabotage.

MR. WARREN: Okay. How about an accident that might be caused, say, by a hurricane, such as debris from the building being blown into the spent fuel pool?

DR. MASNIK: Again, that is an issue that is an ongoing concern, and it's covered under the current operating license. So those kinds of concerns are a day-to-day concern on the NRC, and it's outside the scope of the license renewal.

MR. WARREN: I mean, so it's outside the scope of the Environmental Impact Statement. Is that what you're saying?

DR. MASNIK: That's correct, outside the scope of our environmental review for that facility.

MR. WARREN: So the Environmental Impact Statement does not include anything to do with --

DR. MASNIK: It does not.

MR. WARREN: -- possible contamination from an accident from the spent fuel pool?

DR. MASNIK: It does not.

MR. WARREN: Okay. Another question I had is you had mentioned that in the combination of looking at the alternatives to the plant, you mentioned the combination included oil, gas, coal and combination. Does that mean that wind, solar, tidal and conservation were excluded when you were assessing the alternative to re-licensing the plant?

DR. MASNIK: What we did was we looked at the alternatives, alternative power generation from a number of different sources of generation, and we recognized that one of the possible ways of replacing the power would be a combination of alternatives, and that's the one we talked about, a combination.

We also looked at solar and some of the other newer technologies as well as alternatives, but we did not consider them in a combination I guess to answer your question.

MR. WARREN: Okay. So none of the non-fossil fuel alternatives, none of them were considered in a combination as an alternative to re-licensing the plant is basically what I'm getting here. Am I correct in assuming that?

DR. LaGORY: The combination of alternatives that we looked at was a 530 megawatt natural gas plant together with conservation, 40 megawatts conservation and 70 megawatts of purchased power. That was the combination of alternatives that we evaluated.

We looked at alternate energy sources as single energy sources for full replacement. So we looked at solar, and we looked at wind as a replacement possibility. We did evaluate those alternatives, but they weren't part of the combination suite that we evaluated.

MR. WARREN: Is it your intention to look at those in a combination in deciding alternatives to re-licensing this plant?

DR. LaGORY: The combination, I mean, we can take that as a comment. Right now our alternative evaluation, we feel, is covering a broad spectrum of the alternatives possible. A combination of alternatives, if you will, where you actually identify a combination of different power sources for replacement could constitute almost an infinite variety of energy sources.

We picked one that we thought was most likely to be implementable.

MR. WARREN: Okay. I mean other than conservation, it seems that the others that have been picked have the most significant environmental impacts. Obviously solar and wind would have the least environmental impacts.

Appendix A

Another question I had --

DR. MASNIK: Just to follow up --

MR. WARREN: Oh, sure.

DR. MASNIK: -- perhaps you have a recommendation of a combination of alternatives that we can --

O-1

MR. WARREN: I certainly do. I would recommend wind, solar, tidal, and conservation as a specific combination group, excluding all fossil fuels.

DR. MASNIK: Okay. All right. Thank you for that comment.

MR. WARREN: Does this mean this will be done or it's just a comment?

DR. MASNIK: Well, you know, we'll have to go back and --

MR. WARREN: Am I wishful thinking here?

DR. MASNIK: Well, I think it's not beyond the realm of possibility that we could consider that for you.

MR. WARREN: Can I make an official request?

DR. MASNIK: Sure, sure. You have.

MR. WARREN: Okay. Thank you.

DR. MASNIK: An on-the-record comment is a request.

MR. WARREN: Thank you.

Another question I had was regarding the cooling towers. You had mentioned the use of water from Barnegat Bay which has a very high saline content, salt content. Have alternatives to this type of cooling tower that might include fresh water or brackish water been considered? And if not, why?

DR. MASNIK: Actually the water requirements for such a tower would be extremely high and would probably exceed -- well, certainly would exceed the flow of Forked River and Oyster Creek. There's a possibility that you could remove some ground water, but again, the volumes

of water even for the closed cycle system are extremely high, and it would be questionable whether or not groundwater supplies would be available.

MR. CAMERON: Let me borrow this back and let's do this quickly. Could you just repeat that and tell us who you are?

MS. ZIPF: My name is Cindy Zipf, Clean Ocean Action.

I just wanted for you to clarify the volume. I do have a question, but you answered his question saying it's a large volume. What is the volume?

DR. MASNIK: Off the top of my head I don't know the number. Kirk, do you? Can we look that up in the book? Do we have that?

MR. CAMERON: Okay.

DR. MASNIK: Give us a second to check the actual number. I don't want to --

MR. CAMERON: And could you just introduce yourself to us?

MR. WARREN: Certainly. My name is Donald Warren. I'm actually here as a representative of Jersey Shore Nuclear Watch and a resident of Ship Bottom, which is about 11 miles from the plant.

Another question I had is if dry cooling has been considered and looked at and evaluated and if not, why.

DR. MASNIK: It has not been considered for this facility. What we did was we asked the licensee based on comments that we received here the last time we were here and based on the draft permit for the NPDES permit which talked about cooling towers, to provide us with a proposal.

The proposal that the licensee proposed was a linear hybrid mechanical draft towers, and that's what we evaluated.

MR. WARREN: Okay. Can I make an official request that dry cooling be assessed as an alternative in the environmental impact to be considered?

DR. MASNIK: Yes, you may.

MR. WARREN: Okay. Thank you.

Appendix A

DR. LaGORY: It's 460,000 gallons per minute.

MR. CAMERON: Kirk, before you sit down, could you just tell us what the 460,000 gallons per minute refers to so that people understand this? And when you do it, can you do it at the mic, please?

DR. LaGORY: You can find the evaluation and all of these specific numbers on page 8-18.

What we're talking about is a water circulation rate of 460,000 gallons per minute. Make-up water would constitute about 14,000 gallons per minute, and that's to make up the water that's lost through evaporation.

MR. CAMERON: Okay. We're going to go to Edith and then back here and we'll get to the rest of you possibly, hopefully.

MS. GBUR: Hi. My name is Edith Gbur, and I represent Jersey Shore Nuclear Watch.

And I have a question, and the question is has the release of low-level radiation from Oyster Creek been considered as a health risk in the Environmental Impact Statement.

DR. MASNIK: I missed one of the words, Edith. Has the -- can you repeat it for me again?

MR. CAMERON: Has the risk of low-level -- the release of low-level radiation from the Oyster Creek facility been considered in the Environmental Impact Statement?

Did I get that right, Edith?

MS. GBUR: Yes.

MR. CAMERON: Okay.

DR. MASNIK: Yes, it has. We've looked at, as Kirk had mentioned in his talk, we came to the site and we reviewed the historical record of releases from the facility, and we made a determination that the releases are a very small fraction of those that are essentially allowed by our regulations.

The maximum exposure to a member of the public last year based on the results of last year's monitoring would have been .026 millirem. To put that in perspective, most of us get about one to two millirem per year watching TV on a conventional television. So it's a small fraction of the radiation that you would get from watching TV, and that's the calculated dose to the maximally exposed individual.

MR. CAMERON: Okay. Thank you, Mike.

Yes, sir.

MR. NOSTI: Yes. My name is Jack Nosti. I'm the president of the Lacey Township Republican Club.

Now, one of the items that you just brought up was of extreme interest to me. Now, if I understood you correctly, you said that the cooling tower requirements of 460 gallons per minute would possibly exceed what was available from the Oyster Creek and Forked River Creek and might have to be subsidized with groundwater.

R-1

DR. MASNIK: The question I was asked was what if you used fresh water to make up the losses associated with the cooling tower evaporation, as opposed to what was proposed by the licensee, and that is to use Barnegat Bay water to make up the losses associated by the cooling towers.

MR. NOSTI: But we're using Barnegat Bay water now.

DR. MASNIK: That's correct. That's correct.

MR. NOSTI: So this same process is going to take the very same water and --

DR. MASNIK: Yes, but considerably less

MR. NOSTI: -- and use it, but not recycle it back in. You're just going to take it and evaporate it into the air.

DR. MASNIK: Yes.

MR. NOSTI: Okay. So you're going to be taking from the same source.

DR. MASNIK: That's correct. Well, I mean, that's the proposal that was put before us by the licensee. I believe that was the proposal; that's what the State of New Jersey had in mind when they drafted their draft permit for the NPDES permit.

MR. NOSTI: Okay, because obviously if additional groundwater is needed, that would have a great impact on Lacey Township because any future development within our town required us to get a water allocation permit based upon how much groundwater is available. So it's quite obvious to us that the present system that is there now that has been working extremely well in the past would be certainly the one that we would favor the most.

R-2

Appendix A

We certainly wouldn't want to favor something that might possibly at some time in the future require taking groundwater because that is a commodity that, you know, there's just never enough of. I know we know down in the lower Cape May areas we're getting, you know, salt water coming into the groundwater systems, and we want to leave groundwater alone as much as possible. Let's affect the environment as easily as possible.

And I suggest that in the future that possibly a meeting like this could be held without air conditioning so that the people who are most concerned about affecting the environment could appreciate what it's like to get back to nature.

MR. CAMERON: Okay. Thank you, sir.

And, Mike, just to reemphasize so that there's no misunderstanding, is that the proposal that we looked at is to use the bay water.

DR. MASNIK: That's correct, and what happened was I was asked what about using fresh water, and there are really only two sources of fresh water, surface water and groundwater. So --

MR. CAMERON: So you're just responding to the question.

DR. MASNIK: That's correct.

MR. CAMERON: All right. Yes, sir.

MR. STROUP: Hi. My name is Ed Stroup.

S-1 I didn't really come thinking I was going to ask you to take a look at something else. I understand that you considered primarily natural gas and curtailed usage for replacement power, but I heard some people call tonight to look at solar, wind, and things like that more and to study that, and I'd like to ask you if you are going to take a look at those things, I would like to ask you to consider certain other factors.

Number one, solar doesn't work well at night, and the wind doesn't always blow. Oyster Creek is a base load plant. It provides power all the time.

S-2 I'd also like you to consider, if you would be willing to do that, when you look at replacement sources for Oyster Creek that you evaluate the costs associated with that replacement. For example, oil is at an all-time high. Gas and coal can be extremely expensive compared to nuclear, and if people can't afford to use it, then it's not going to be a replacement power.

I think we also need to look at the availability and the use of foreign oil and where those prices are at record high and where they're likely to go in the future as you look at this to keep a balance.

And I'd just like to ask you if you are going to go back and reconsider it, would you please consider also some of those things.

Thank you.

DR. MASNIK: Just a quick response. We actually do in our document talk about these alternatives, but what the question was is if we combined a number of these together would the outcome be different than what we did before, and we will look at that combination, but we'll also consider the issues that you brought up as well.

MR. CAMERON: Okay. We have time for a couple more questions. Yes, sir.

MR. deCAMP: My name is William deCamp, Jr. I'm President of Save Barnegat Bay.

We got contributions last year from over 1,700 families in the Barnegat Bay watershed.

Is your purpose at this moment to entertain questions regarding the scope and nature of this hearing or are you just taking any old question?

MR. CAMERON: And this is just to clarify it. As a meeting, "hearing", in NRC parlance means something special, an adjudicatory hearing, but I take it are you bothered by the fact that there are questions that seem outside the scope? I'm trying to figure out how we can best respond to your question.

What is your concern?

MR. deCAMP: I'm not bothered. I'm trying to ask a question appropriate to the format.

MR. CAMERON: Okay. Go ahead.

MR. deCAMP: And at one point I thought I heard the gentleman at the front of the room say that he wanted to clarify the scope of the proceedings.

But if we're open for all questions, I think people would like to know that also.

But anyway, so my question regards the cooling towers, and I believe you found that they would have an impact. Was it a moderate impact?

Appendix A

DR. MASNIK: Well, first of all --

MR. deCAMP: As an alternative.

DR. MASNIK: -- cooling towers is a good question for this forum, and what we do is we don't assign an overall assessment. What we do is we look at a number of different categories or areas, for example, cultural resources, and in one case for the cooling towers or actually in two areas, we said that the impacts could reach moderate levels under certain conditions.

MR. deCAMP: So my question is when you say they could reach moderate, is that like moderately adverse? In other words, are you saying that any impact is adverse?

DR. MASNIK: No, what we're saying is moderate based on our definition of small, moderate, and large that we provided during the presentation.

Can you put that back, the definitions back up? And I think that may make it clear.

MR. deCAMP: And while they're looking for that slide, can I ask was this moderate impact was the result of salinity effects on vegetation. We said those impacts would be small.

DR. LaGORY: We looked at the deposition rates that we would expect of salt in basically concentric circles around the cooling towers, and we looked at what distance would you see an effect on vegetation, and we found that at about three-quarters of a mile there would not be any detectable effect on vegetation with the calculated salt deposition rate that we were finding based on the throughput of the system.

So we considered that a small impact, especially given the fact that we're in a coastal area and most of these plants are tolerant of salt. So about a three-quarter mile ring depending on wind direction.

The moderate impact actually resulted from exceedance of the State standard for particulate emissions for a new source. That standard is 30 pounds per hour of particulate emission, and the calculated emission rate for the two cooling towers would be 60 pounds per hour.

MR. deCAMP: Of what?

DR. LaGORY: Of particulate matter, and in this case it's mostly salt, not entirely. It's like 70 percent of the drift particles would be salt.

MR. deCAMP: So here comes my question. In determining this moderate impact and small impact, are you weighing that against the enormous improvement you would have with entrainment, impingement, and thermal pollution and heat shock?

In other words, did you take everything into the balance?

DR. LaGORY: Well, we state what we think the impacts would be. We state that we think there would be a reduction in the impacts to aquatic resources, for instance. We state that we're going to be using about 70 percent less water, and you would expect a proportional decrease in impacts to aquatic resources.

Remember our conclusion based on the studies that we had available to us was that the impacts of the existing once through system would be small, that the studies that have been conducted have not shown an effect of Oyster Creek on the Barnegat Bay system.

There are large numbers of organisms that are pulled through the system, both entrainment and impingement, but there's no indication that those are actually causing effects on populations within the bay.

There have been some very specific studies examining that effect.

MR. CAMERON: I think that what this gentleman's concern is is how does the NRC look at all of the impacts identified. How are those balanced in terms of using the Environmental Impact Statement in NRC decision making. I think that's the question.

MR. deCAMP: That is my question. Why do you only rate as small or moderate those impacts on one side of the equation and then just not even count in your rating of small or moderate or large the positive impacts? That would be my question.

MR. CAMERON: And I'm going to let them answer and then I'm going to try to get two other people.

MR. deCAMP: I have others.

MR. CAMERON: Well, you can during the comment period, but we need to get to that so that we can make sure we get everybody on here.

MR. deCAMP: But I have another question about the scope of the hearing.

MR. CAMERON: Okay. We need to address these quickly.

DR. MASNIK: All right. Let me quickly address your question here, and that is that obviously in these sorts of quantitative assessments where we're looking at a number of different categories and a number of different options, it's often difficult to come up with a scheme that will satisfy everybody.

Appendix A

Now, the National Council on Environmental Quality said that this is an acceptable way of comparing alternatives, and based on our assessment, we've come out with the conclusion that the impacts associated with impingement, entrainment, and heat shock of the current system is small for the organisms in the Barnegat Bay, and we've come out with a moderate impact associated with the salt releases.

T-1 MR. deCAMP: If I could just be permitted to speak because I know we don't have all night, I'm not going to argue with you. I'd just like to go on record as expressing my opinion that it is totally preposterous with all that is known about impingement, entrainment, and thermal pollution to say that it is minimal impact or negligible. It is just absurd.

But anyway, I have another question, and that is is it not the case that if Oyster Creek runs for 20 more years that they will have to build another facility to store high level nuclear waste?

MR. CAMERON: Okay. Thank you.

MR. deCAMP: But it's the scope of the hearing.

MR. CAMERON: Well, you asked the question, and we're going to give you an answer.

MR. deCAMP: And can I follow up?

MR. CAMERON: We really have to --

MR. deCAMP: I would be finished by now if you weren't just --

MR. CAMERON: We really have to give other people a chance to ask questions.

DR. MASNIK: We certainly can speak to you after the meeting, too.

MR. CAMERON: And we will talk to you after the meeting, okay?

MR. deCAMP: Right, after the meeting.

MR. CAMERON: That's right.

DR. MASNIK: To answer your question, yes, there would be additional spent fuel generated based on 20 additional years of operation, and that fuel would be stored on site until a high level waste repository is made available

MR. deCAMP: Okay. So if you are going to store it on site --

MR. CAMERON: We really need to get you on the record. We're going to go to this gentleman and this gentleman and we will try to answer all of your questions after the meeting because we have to get to people who want to make comments. That's what we need to do.

Yes, sir.

MR. WEINMANN: Hi. My name is Roberto Weinmann. I have a house in Forked River.

And I presented at the last meeting when the question about whether there was an impact analysis of the reverse flow of the Forked River on the erosion, on the wildlife section that is on the bay and on the deposit of sediments all over the Forked River where there are private residences that don't have access to the river readily.

Because of the river's flow, the sediments are accumulating. And I don't know, there must be aerial photographs to show where there has been coastal erosions and regions that are not protected by these barriers that we put where we have residences.

DR. MASNIK: Yes, Roberto, I remember your comment, and in fact, we had our hydrologist look at it, and if you look in [Section] 4.7 of our document, we address that concern.

What we did was we went back and looked at our Generic Environmental Impact Statement that we did in 1996, and in fact, we used the example of Oyster Creek as an example to say that we recognize that operation of facilities, particularly in coastal areas and certainly once through plants, could result in some movement of sediment, but that these effects are localized and occur close to the plant.

The decision was made at that time that this was considered a small impact. I recognize that's not much help to you because you, in fact, are the owner of a home and a boat that has difficulty getting out into the bay.

We did state in there that there perhaps is something you can do in talking with the licensee over this issue, but we recognize it and we realize that this is an occurrence that will happen.

MR. CAMERON: Okay. Thank you.

Yes.

MR. DILLINGHAM: My name is Tim Dillingham. I'm with the American Littoral Society. It's a conservation organization.

I have a question, I guess, about the science on which you base the EIS. It's actually, I guess, a question of clarification. The way I read it, you went back and evaluated the studies that have

Appendix A

been done as part of the GEIS and other earlier work, and the latest date I can find it is somewhere around 1986. Is that accurate that that's the information on which this work has been developed primarily?

DR. MASNIK: I think you may have it a little bit inaccurately in your description in that what we did was we did go back. First of all, I believe your concern is on the aquatic issues; is that correct?

MR. DILLINGHAM: Primarily.

DR. MASNIK: What we did was we did go back and look at the data that was developed back in the '70s and the early '80s. We also examined the record to see if there were any more recent data, and certainly the majority of the sampling was done back in the '70s and '80s when the licensee was in the process of getting their 316(a) and 316(b) demonstration studies together.

There has been some data that was collected since that time, not a whole lot, but some data.

In addition, the licensee, in response to the EPA's Phase II regulations, has begun a study at the plant that began, I guess, last September or October to look at impingement, entrainment losses associated with the plant.

That data is not published, but we are aware of it, and we have discussed with the licensee and their contractor what the general findings of that study has been to date.

Based on that information and primarily a study commissioned by the State, the VERSAR study that was done back in the '80s, we came to the conclusion that the impingement [and] entrainment losses represented a small impact event.

MR. DILLINGHAM: Okay. So basically the information in which you reached the conclusions that the impacts were small is based on field data or information that is at least 20 years old.

DR. MASNIK: Some of it, yes, yes, but not entirely.

MR. DILLINGHAM: And there's a comment in I guess it's the record from the scoping hearing. It looks like a comment submitted by the U.S. Fish and Wildlife Service, which asserts that that information is not adequate to make a judgment about cumulative or longer term impacts, and the NRC's response is sort of that, "Well, we think it is sufficient".

If you could just give me some more insight as to how you reached that idea that 20-year-old data is sufficient, given all of the changes that have happened in this bay and in the watersheds around it in that time period.

DR. MASNIK: I guess my response would be the same as what I just said. We looked at the data back then. We looked at the very limited amount of data that has been collected since then. We haven't discovered anything that shows any dramatic changes in the losses in the bay.

In looking at the data or at least in our discussions with the data that has been collected at the plant, the losses associated with impingement and entrainment are similar to what was experienced back in the '80s. So the expectation is that if populations had dramatically increased or decreased in certain species, those kinds of changes would essentially show up at the plant just like any sampling device would demonstrate it.

So we don't see that.

MR. CAMERON: Okay. Thank you all for those questions. I'm sorry that we don't have time right now to go to any more questions on this part of the meeting because we do need to hear from all of you who want to speak.

As I said, the staff will be here after the formal part of the meeting closes for as long as you want to stay to talk and try to answer any of your questions, but we're going to go to our first speaker at this point, and that's going to be David Most, who I believe is a Lacey Township committeeman.

David. And if you could come down here for us.

And next we'll go to Paul Gunter and then Don Warren, to give you an idea of who's going to be up next, and this is David Most.

MR. MOST: Thanks.

How's everybody doing this evening? It's nice to see everybody come out and have some dialogue here. I want to thank the NRC for having this meeting.

And I just want to thank the NRC, too, for taking into consideration the different factors for alternate power sources because we all recognize who work in the industry that Oyster Creek is a base load plant.

W-1

So I do favor renewable energies, but I think we need to keep them in the perspective that they belong in as that they are a complement to a base load plant.

As far as looking at alterative sources, I think the age we're living in is very interesting to see these changes that we see in our environment in the last five years that I recognized as far as global warming, the quality of our air and the need to lessen our dependency on foreign oil.

W-2

Appendix A

We live in a dynamic society where our environment is changing constantly. Our population is increasing. Our cars, the amount of vehicles we have on the road in New Jersey is five million cars. The fellow that was talking about conservation, we have luxury military vehicles that are on the road, the Humvee. I mean, does that make sense to you? It doesn't make sense to me.

but when you talk about conservation, people have all different kinds of ideas about conservation, and the reality is you have your idea of conservation and the fellow that owns the Humvee has his idea of conservation, as far as his idea.

W-3 Also, I recognize as a committee person, it's very encouraging to see that I have actually residents coming out and asking why aren't we building a standardized reactor behind Oyster Creek, and it's really amazing the heightened level. they are becoming more educated as far as nuclear is concerned.

W-4 And what I wanted to talk about is we always end up returning to what are we going to do with the spent fuel, and I see the different alternatives that are out there right now, and again, it is encouraging to see that we're working with other countries. We're looking to recycle fuel possibly. We're looking to start up reactors that actually produce hydrogen, maybe to supply the gas, to supply cars for hydrogen fuel cells. I mean, wouldn't that be a great thing?

So all I'm saying is technology moves forward. Look at where we've come in the last 50 years, and I have to tell you I lived in Forked River most of my life, and I live three miles -- I was raised across the farm on the east side in the development, and Oyster Creek come on line in '69. I've worked there for 25 years, and as a worker and supervisor at the plant, we all believe as far as minimizing the impact we have to our environment.

W-5 But I have to tell you from '69 to date and moving forward, I truly believe that we have had a minimal effect on the environment. Now, if you want to compare that to a coal plant that we had there, I watched a little clip on HBO Sports with Bryant Gumbel and he was interviewing certain people in different towns that house these coal plants, and the companies were actually buying up some of the towns and destroying their homes because the people couldn't live in the towns anymore. The kids in the park couldn't play in the parks anymore because of all of the respiratory diseases.

W-6 So I do think it is a very important thing to look at the balance because if you do deny the Oyster Creek re-license, we have to look towards the future and look at the impact of what that's going to have in our environment.

But I truly agree with the NRC's assessment, and I definitely believe that Oyster Creek is worthy of re-license.

Thank you for your time.

(Applause.)

MR. CAMERON: Okay. Thank you.

And we're going to go to Paul Gunter now. Paul.

MR. GUNTER: Thank you.

My name is Paul Gunter. I'm Director of the Reactor Watchdog Project with Nuclear Information and Resource Service in Takoma Park, Maryland.

We were the principal author of the contention on the dry well corrosion at Oyster Creek, and we've been joined by New Jersey Coalition and Rutgers Environmental Law Clinic in a license challenge, and tonight we're here to talk about the Environmental Impact Statement.

Let me start by saying that NRC should suspend all licensing proceedings under the National Environmental Protection Act -- Policy Act and its governance. We make this request in light of the Ninth Circuit Court of Appeals decision on June 2nd, which considered how NRC was handling the question of environmental consequences from a successful terrorist attack by a nuclear facility by providing a public hearing and an environmental review under and as required by NEPA.

N-1

NRC has repeatedly ordered that the environmental consequences of a terrorist attack on any nuclear facility is beyond the scope of these proceedings because they say that it's so speculative and remote that it cannot be considered in a site specific proceeding.

Well, the federal court found that NRC's denial of the public hearing on such security contentions to be unreasonable. In fact, it is our concern that NRC has failed to recognize and uphold its obligations to provide the public with a democratic hearing process as governed by law under NEPA specifically with regard to our homeland security.

And this is a very serious charge, and I'm sure that the NRC itself is not united and unanimous on the decision to withhold these public hearings from the public on particularly the issue that is so close to ground zero as Oyster Creek is where we stand today.

As such, now, this Environmental Impact Statement is fatally flawed by missing the analysis of the environmental consequence of terrorist attack on Oyster Creek.

I'd like to take one more point up. I know I'm running out of time, but NRC has failed to fully implement the Endangered Species Act. NRC we saw tonight has stated that the draft supplemental Environmental Impact Statement on 20-year additional extension of Oyster Creek and its once through cooling system is small in environmental consequence.

N-2

Appendix A

Oyster Creek nuclear power station draws in more than 1.5 billion gallons of water per day to cool the nuclear reactor, and that super heated water is discharged to Barnegat Bay. In fact, it is well documented that Oyster Creek and its once through cooling system is a large marine predator where it is capturing not only biota, life supporting biota of the marine environment, but it's also all the way to the capture and killing of endangered sea turtles first reported in 1992.

In fact, the heated discharge is attracting sea turtles into Barnegat Bay and into the reactor cooling intake system, and there they are entrapped. These rare animals on debris screens where they are being injured and are routinely suffocated under water when not promptly rescued and resuscitated.

In 2004, Oyster Creek captured eight of the world's most endangered species of sea turtles, the Kemp's ridley. Three of these rare turtles were recovered dead. The other five were recovered alive. The captures, all within several months of each other, were also a record breaker for the nuclear power station and in violation of Oyster Creek's incidental take statement, which is required under the Endangered Species Act.

The reactor's previous limit was set in 2001 by a biological opinion established by the National Marine Fisheries Service to permit no more than five live captures and three lethal takes of this species. Even this limit was raised from the original 1995 biological opinion which had set the limit for a single Kemp's ridley.

Now, this is just the Kemp's that we're talking about, but on September 22nd, 2005, after consultation with NRC, the National Marine Fisheries Service again raise Oyster Creek's incidental take statement to now a total take of eight Kemp's ridley, four lethal captures on the water intake screens.

Since Oyster Creek first started operating and reporting, we've noticed that there's a pattern of the operator, the Nuclear Regulatory Commission, and the Marine Fisheries Service all working together to revise the incidental take statements consistently upward.

NIRS contends that this trend is not based on best available scientific data as required by Section 7 of the Endangered Species Act, but instead rather reflects the capitulation of the NRC and the National Marine Fisheries Service to the nuclear industry agenda.

NMFS has a practice of revising the ITS upwards in response to requests by NRC without conducting a serious scrutiny of the total amount of such taking and how it may affect sea turtle populations as broadly defined by the Endangered Species Act to include killing, injuring and harassing, which is inconsistent with the overall ability of the species to survive and recover.

Both NRC and NMFS have employed an overly narrow definition of taking in issuing these incidental take statements by focusing almost exclusively on the numbers of turtles that are

killed by the once through cooling system and disregarding to the extent which the animals are being harassed as defined in the Endangered Species Acts to encompass, quote, any additional and negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns, which include, but are limited to breeding, feeding or sheltering. And that's in the Code of Federal Regulation.

This would include attracting the endangered sea turtles away from less hazardous areas where the animals would otherwise engage in normal feeding and sheltering, but this appear to have been inadequately addressed in either the biological opinion or this Environmental Impact Statement.

Let me just close by saying that Section A(1) of the Endangered Species Act provides that all federal agencies, quote, shall in consultation with and the assistance of the National Marine Fisheries Service or the FWS utilize their authorities in furtherance of any purpose of this chapter by carrying out programs for the conservation of endangered species and threatened species.

NIRS calls into question that NRC has complied with this obligation to protect endangered species, particularly sea turtles with this submission of the EIS, especially since there is an available reasonable alternative that would demonstrably reduce the documented adverse effects of power plant operations on endangered species, basically going to the dry cooling system.

To the contrary, NRC has consistently chosen to protect Oyster Creek from adopting a nondestructive cooling system by accommodating the continued destructive operation of the current once through cooling system with a license to kill more federally protected endangered species. As such, given the operation of Oyster Creek once through cooling system would continue to attract sea turtles and kill and injure and harass endangered species over the license extension period. NIRS contends that NRC is not utilizing its authorities in furtherance of the conservation purposes of the Endangered Species Act.

MR. CAMERON: Thank you, Paul.

(Applause.)

MR. CAMERON: We're going to next hear from Don Warren and then Edith Gbur and then we're going to go to Ed Stroup and John Rayment, and we will get to you, Mr. Schilling.

This is Don Warren.

MR. WARREN: Thank you.

Appendix A

Hi. My name is Donald Warren. I am a member of Jersey Shore Nuclear Watch. I am also a resident of Long Beach Island. Actually I live in Ship Bottom, which is only about 11 miles from the plant.

I am also very significantly a health care provider in this community, which means that I am directly involved in the care of people who can suffer consequences of environmental impacts from any accident and release of information that can happen at this plant.

O-3 I'm here because of my concern that this plant may be re-licensed and continue to operate for another 20 years, and especially because of what I feel is a tremendously biased and inadequate Environmental Impact Statement that's being proposed by the NRC here.

O-4 The NRC should be protecting us, not serving Exelon and Oyster Creek. When they are analyzing data for their environmental impact statement, it should not be the data that's provided by Oyster Creek. For a best case scenario, my case in point being the cooling towers, they stated that Oyster Creek had given them the cooling tower that they wanted, and they have not analyzed a dry cooling tower which would not require water to be taken from the environment, which I think is extremely significant.

O-5 They also mentioned earlier that they did not include as alternatives a combination of non-fossil fuels, very specifically tidal, wind, solar, which could be included with conservation which would have a dramatically different effect on their conclusions.

O-6 I also have a tremendous loss of feelings of credibility with the NRC that relate to actually coming to one of these first meetings less than a year ago. At that meeting I held up a picture of the reactor at Davis-Besse, which I don't know how many of you can see, but it's extremely rusted and corroded. The NRC was in possession of this picture, as well as the operators of the plant, and yet the NRC continued to allow this to operate to the point where they had a corrosion hole that was the size of a football. This was in the top of the reactor. Had this gone all the way through, this reactor would have gone critical, and they would have had a major core meltdown.

O-7 They assured me that they had paid a lot of attention to that and were looking extremely closely at this plant and would not allow something like this to occur again. However, I am also part of the organization Jersey Shore Nuclear Watch which part of this coalition that's looking at the severe corrosion in a dry well line.

For months and months and months we asked to look at ultrasonic test data of this dry well liner from 1996. It was not given to us. We were told it was proprietary information.

It has since come out through this public meetings and through legal actions, and the conclusion is that this data shows that the dry well has actually grown thicker. In some

miraculous feat of God defying the physics that we know, the metal has actually gotten thicker, and this is well beyond the margins of error that could be shown in the testing, which leads us to believe that obviously this data was seriously flawed.

The NRC did not seem to notice this for over ten years because this data was done in 1996 and they were in possession of this since 1996. So we have serious reservations that they are really protecting us, which is what they are supposed to be doing. They are not supposed to be trying to keep this plant open no matter what.

Getting more specific onto the environmental problems I have here, I specifically asked a question about whether the spent fuel pool was included in the environmental impact statement because this spent fuel pool is covered only by a steel building. There is no concrete covering of this.

O-8

If you all have seen the pictures from the areas in Louisiana and Alabama post Katrina, all of those same type of buildings that were warehouses virtually disappeared in the hurricane. They were blown down.

O-9

I have tremendous concern about this because should any of this debris fall into the spent fuel pool, it can dislodge the racks of fuel rods that are in there. These fuel rods must be kept at certain spacing so that they maintain temperatures because if those temperatures are exceeded, they are encoded with something called zirconium, and this can burn. Very frequently the NRC and people from Oyster Creek will tell you that a Chernobyl cannot happen here. Well, a zirconium fire in the spent fuel pool is the same -- I shouldn't say "the same" -- is extremely similar to a fuel fire that happened to Chernobyl. The only difference is the consequences would be far more devastating because of the massive amounts of quantity of spent fuel that are in there.

Chernobyl was only two years old. There wasn't nearly as much radioactive material and Curies at that plant.

I am extremely concerned because in the past month and a half three small aircraft have dropped out of the sky and landed within 20 miles of Oyster Creek. One of them I know for a fact landed about 11 miles away on Route 72 because it landed about a mile away from my house.

O-10

There were also two banner planes that have just gone down recently within a 20-mile region. So there has been some concern about a terrorist attack. God forbid that this should happen on the spent fuel pool, but it would seem from past history we don't even need that. We have planes falling out of the sky here that easily any one of them could have landed on this plant, had we not had some divine intervention looking out for us.

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That's my opinion, and obviously the NRC and Oyster Creek are not.

O-11

Another problem that I have is with the cooling towers. As I through up before, they are only using in this study the cooling towers which is personally I feel is a worst case cooling tower for the plant because of the large quantities of water that would still be required to be pulled out of Barnegat Bay.

There are other types of systems. There are systems that are dry that would not require any water to be taken out, and when these are included in an Environmental Impact Statement, they cooling towers would not be moderate. In fact, they would probably not even be small. They would probably be as small as they could possibly be.

O-12

The effects of the tremendous amounts of water, and I'm not going to keep continuing here because obviously Mr. Gunter really covered this very well, but the effects of the tremendous quantity of water that is being pulled out of Barnegat Bay is devastating. The amount of aquatic life that is being pulled in there is horrendous.

The fact that they are basing this on information from 1978 and not current levels, I personally am aware of the oyster beds that have seemed to have disappeared from Barnegat Bay. I am also aware of the declining blow fish numbers in Oyster Creek. I am also aware of the very recent studies that have been done and work that has been done out of Rutgers on actually the environmental quality of the bay and the degradation that's happened to the bay.

And I think that this is the data that we really should be looking at, current studies, and if the NRC is planning on re-licensing this plant for 20 years, then they need to go out in the bay and they need to look at the bay and they need to have real data, current data so that they really know exactly what kind of an environmental impact Oyster Creek has had on the bay and the be making a realistic environmental impact statement, not making assumptions from 1978. This is not good science.

Thank you very much.

(Applause.)

MR. CAMERON: Okay. Thank you, Don.

We're going to go to Edith Gbur and then Ed Stroup and then Edward Schilling.

Edith, would you like to come up here? Thank you. No, there's no mic on there. So why don't you come up to the front for us? And we'll probably have to adjust this for Edith. It's right over here. All right, good, and he'll adjust that down for you.

MS. GBUR: Hi. I'm concerned about low level radiation. The NRC just reported before in response to my question about the Environmental Impact Statement about what that showed in the release of emissions from Oyster Creek, and the answer is that it was something like zero, zero, zero, zero, zero, nine, four-tenths or four-whatever, and I suspect I am very suspect about that data, and I believe there's a possibility that the data might be flawed.

Q-1

About three years ago Oyster Creek had emitted the highest amount of radioactivity, including Strontium 90, among all the nuclear plants. What happened between three years ago and last year?

Number two, much of the data is obtained by the stacks. The stacks is monitored by Oyster Creek. In Illinois, the nuclear plants are monitored by independent sources and for good reason, because it's easy to change the data.

Q-2

There's an epidemic of autism and cancer, and that has been linked to nuclear emissions. The National Academy of Sciences recently stated that no amount of radiation is safe. We would like to recommend that an independent study of radiation from Oyster Creek be undertaken as part of the Environmental Impact Statement.

Q-3

Q-4

Thank you.

MR. CAMERON: Okay. Thank you. Thank you, Edith.

(Applause.)

MR. CAMERON: Ed and then we'll go to Edward Schilling.

MR. STROUP: Good evening. Good evening. My name is Ed Stroup, and I'm President of Local Union 1289, which represents 230 bargaining unit members at Oyster Creek.

I have to tell you I'm tired of the untruths, innuendos and inflammatory statements made by some participants in this process. The truth and the facts are ultimately important here.

With that in mind, I testified earlier today. I'd like to make a correction to my earlier testimony. Minor as it is, I stated that the artificial reef that Oyster Creek installed was in the bay. That's incorrect. It's in the ocean, and I'll speak a little more about that later.

Nearly 100 years ago the IBEW was originally formed because 50 percent of the workers in the electrical industry were killed at work. The IBEW has a long history of safety and providing safety for our members and the public, and that continues today.

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- S-3 | Our members are highly skilled and highly trained, as is everyone at Oyster Creek, union, management, and security. Each is a skilled professional in their field. I can assure you they all take their responsibility seriously and work hard to insure the safety of the public and the environment all day every day.
- It's my belief that one of the great injustices in this whole re-licensing process is that these dedicated professionals, along with the NRC and the state police are treated with contempt and referred to basically as incompetent by some of those who would like to see Oyster Creek and all nuclear plants closed. I'd like to take this opportunity to thank the NRC and the State Police for their hard work and professionalism that they exhibit every day.
- Our members live and work in the local community. Their families live close to the plant, and their children go to school here. Our lives and those of our children and families, as well as the public we serve, would be affected by any problem at the plant. We would never compromise our principles for the safety of the plant or the public.
- S-4 | Oyster Creek produces enough energy to power 600,000 homes and adds \$52 million a year to the local economy. We contributed \$202,000 last year to the United Way and over half a million dollars to the United State over the last three years.
- We contributed \$809,000 last year to the DEP Fish and Wildlife Department and \$5,000 to the Audubon Society to help clean water fowl affected by the Delaware River oil spill.
- S-5 | As I said before, Oyster Creek sponsored and installed an artificial reef in the ocean working with the DEP, 3.1 miles out. That's a good thing, but I heard some people earlier today purported to be environmentalists dismissing that as not important.
- S-6 | I disagree with that. At the same time Oyster Creek was undertaking these environmental friendly projects, Oyster Creek produced zero carbon emissions and avoided 7.5 million metric tons of carbon dioxide that replacement power would have produced. Oyster Creek avoids carbon emissions equal to more than two million cars per year, or to put it differently, an amount equal to half of all the motor vehicles in New Jersey.
- S-7 | At Oyster Creek we work hard to protect the environment, including Barnegat Bay. On a day to day, hour to hour basis, we monitor water temperatures and regularly take water samples to insure safety. We coordinate any plant load reductions or shutdowns to avoid any risk to marine life. This is a costly practice, but it's essential for us to meet our commitment to the environment.
- S-8 | I can assure you our members, as well as management and security, are all highly trained, highly skilled professionals who take their responsibility seriously. Their first priority is to protect

the public and the environment. They insure that Oyster Creek is a safe, clean, reliable, environmentally friendly plant, all day every day.

For all of these reasons and others, I urge you to re-license Oyster Creek.

Thank you very much.

(Applause.)

MR. CAMERON: Thank you, Ed.

We're going to go to Edward Schilling and then next to David Sims and then to Jennifer Nelson, and this is Edward Schilling coming up to talk to us.

MR. SCHILLING: I'm very happy that we who live in Ocean County have a fine power source such as the Oyster Creek generating station. However, I do have a little concern because of an article that I happened to read in the Wall Street Journal. That was on April 9th in 2002 in an article entitled "Nuclear War."

X-1

As reported in the Journal on that date, Tuesday, April 9th, 2002, the Brookhaven National Laboratory located on Long Island estimated that a fire in a nuclear fuel storage pool could release enough radiation to render 188 square miles uninhabitable.

In addition, this scientific research center estimated that, in quotes, tens of thousands of cancer fatalities and financial losses of \$50 billion would result in such an accident.

This, of course, is a worst scene scenario, but we are at war, and we do have a very, very mean, nasty enemy, and at any one time they could approach that plant from three or four directions and what would happen?

X-2

As has been stated by some of the previous speakers, there would be almost cataclysmic results, and I just wonder what can be done.

I myself think that because of the current research and ongoing research into the uses of coal as a source of power, of which the United States has a proven reserve of over 300 years, we could substitute that for the fuel used at Oyster Creek and we would be free of that worry of a nuclear catastrophe.

X-3

I don't know what the answer is, but I do know that these results that I mentioned, these statistics were not pulled off a tree, that they have been the result of research, and I hold out this information for the benefit of all the concerned NRC scientists who are present who have certainly gone to great lengths in expressing the way it should be and what can be, but let's not

Appendix A

forget that we are at war even though we don't have an enemy right now at our shores, at our gates.

Thank you very much, ladies and gentlemen. Thank you.

(Applause.)

MR. CAMERON: Thank you, Edward.

David Sims.

MR. SIMS: Good evening. I'm Dave Sims, and my company is Ecological Systems, and I install solar and wind electric generators.

First of all, I want to mention to the guy from the Electrical Workers I don't think anybody has insinuated your people are anything but as competent as any technicians on the face of the earth.

And as far as the NRC, I'm certain they're doing the very best they can to square away to the issues in a fair manner.

Y-1 I think the real problem is that there actually is a thing that happened over in Chernobyl that's very real. Okay. Accidents happen, weird things happen. Technologies advance. I think the gentleman who talked about coal being a viable source made an excellent point. There are better scrubbers available now, and that's a technology that has much room for improvement.

Y-2 There are ways to deal with the fumes from coal in a way where there's absolutely no potential of completely destroying the entire economy of the country, and what happened in Chernobyl pretty much destroyed the Soviet Union. You can pretend you're blind to that or ignore it in any way you want, but it is simply ridiculous. Okay? A very real thing happened over there.

Y-3 Anybody who thinks that a nuclear plant is 100 percent safe is simply joking with themselves. They're not 100 percent safe. They're darn near 100 percent safe, and worst case scenarios are certainly worst case scenarios, and we don't want to be doomsdayers (phonetic) and stuff and say the end of the world is coming, but a friend of my was saying just the other day, "The juice just ain't worth the squeeze." Okay?

Y-4 You're squeezing like heck to try and get some one percent of extra grid power out there. Well, we're doing solar and wind projects every day of the week. We're doing energy conservation projects. If nuclear had anything resembling the obstacles that a wind project has, you could never get a nuclear plant in. Okay?

We have to go through incredible bureaucratic hassles to get a permit. I know because I put in a significant portion of the wind generators on shore in the last five years. It's very, very difficult to get a permit to put in a wind generator at your house.

The obstacles that the NRC is faced with are nothing compared to that, and the potential hassles and problems associated with nuclear plants are magnitudes larger than what's associated with wind. Between zoning and everything else, it's not that easy to get a wind project in.

You know, I've heard Congressmen and everybody else say, "And wind is going to do the trick." Well, it's not because you can't even get a permit. Okay?

That's going to change and maybe it will change within the next five years, but what about maybe licensing this plant for five years, not 20, because evolution is actually occurring in this world? I don't think 20 is a good number of years. It's a long time, and I think that coal is a lot safer.

Y-5

Y-6

And I certainly appreciate the electrical union wanting to keep their people working. I know that's your job, but there's better stuff to do than work at a nuclear plant. I mean, this Strontium 90 stuff is simply not a fantasy. It's real. Leukemia, cancer, that's the plague of the 20th Century. You want to make sure that people get a whole bunch of that? Well, keep saying the stuff you're saying. You get to say it. You've got the right. I think it's wrong.

Y-7

Y-8

Thank you.

(Applause.)

MR. CAMERON: Thank you, Dave.

Jennifee (phonetic)? Is Jennifee still here, Jennifee Nelson? Here she is.

MS. NELSON: Good evening, everyone. My name is Jennifer Nelson. I'm an engineer at Oyster Creek and a resident of Jackson Township.

I just want to talk to you for a few minutes tonight about what I do and the things that I keep in mind as I go about my duties every day.

My first concern and the concern of everyone at the plant is to protect the public. At Oyster Creek our most critical systems are not those that produce power and make us money. They're the safety systems that we would use to protect the public in the unlikely and unfortunate event of an accident.

Z-1

Appendix A

A large portion of our resources and time is spent monitoring and maintaining these systems, as well as making sure that we meet all regulatory requirements associated with these systems.

My second concern is they're not protecting the environment. Our goal is to have as little impact on the environment as possible. Our plant processes and procedures insure that we operate the plant in a manner which minimizes our impact.

Z-2 I'm most proud, however, of our efforts this past winter when plant conditions forced us to shut the plant down for maintenance. We recognize that our shutdown would threaten the nonindigenous fish species that enjoy our discharge. In order to reduce any possible impact at significant time and money spent, we implemented a supplemental heating system in the discharge canal which maintained the environment to save those fish.

Z-3 In addition, someone talked about sea turtles. We train our operators to recognize the turtles that are endangered, and they go through some pretty impressive efforts. They're trained to resuscitate turtles. We're talking about turtle CPR.

Z-4 My third concern is around protecting plant equipment. As an engineer, I interface with plant operators, maintenance personnel, chemists and others to make sure that each system and significant component is operating as it should. By monitoring and maintaining the equipment effectively, we can insure clean, safe, and reliable operation of the plant.

Z-5 Oyster Creek is run by a team of dedicated and talented professionals who are just as committed as I am to protect the public, protect the environment, and protect the plant. We're looking forward to continue to operate and provide clean, safe, and reliable power to New Jersey until 2029.

Thank you.

(Applause.)

MR. CAMERON: Thank you, Jennifer.

We're going to go to Jack, Jack Nosti, and then to Wayne Romberg, to Roberto Weinmann, and to Cindy Zipf.

And this is Jack Nosti.

MR. NOSTI: Good evening. My name is Jack Nosti. I'm the President of the Lacey Township Republican Club.

I would just like to reiterate some of the remarks I made earlier, that the Oyster Creek nuclear generating station has been an extremely friendly and great neighbor to the residents of Lacey Township, and for this reason this is why those of us that have chosen to live and raise our children and grandchildren in Lacey Township very strongly support and endorse the clean and safe continued operation of Oyster Creek.

There's no way that we would do this with our families there if this wasn't what we believed actually is the case. And we ask the NRC to continue your studies as you've done. It looks like the operation as it is appears to be the best way to go. We feel it's the best way to go.

There's been extremely little impact on our environment with Oyster Creek. We hear constantly from people that say the sky is falling. What if this happens? What if that happens? I could have got killed on the parkway, you know, here tonight, but yet, you know, I got up, a long day, tired, you know, extended day, and came here because I feel it's important.

We can't worry about the naysayers. We have to take our best look at what we feel is best for the community and go with that, and I ask you to continue to do what you're doing. I think you're doing a great job.

Thank you.

MR. CAMERON: Okay. Thank you, Jack.

And Wayne.

MR. ROMBERG: Thank you.

My name is Wayne Romberg. I live in Forked River. Actually I live on Forked River about a mile from the plant. I'm on the intake.

And we moved here about five years ago. I could have chose to live anywhere I wanted to. I came with the company that bought the plant, and I chose about a mile from the river, not far from where this gentleman lives, and we have some common interests. He's trying to get his boat out, and I just bought a new sailboat. So I've got to get it out, too. So we're interested in all of the things that have to do with the river.

I also enjoy fish, a fisherman. I enjoy eating fish from Barnegat Bay. We have got some great fishing here, and I really like this area. I'm delighted.

I've been in this business 37 years. I've seen lots of things. I've worked for lots of utilities. I'm impressed with the people here at Oyster Creek. They try to do the right thing all of the time.

AA-1

Appendix A

It's a good, little plant. It's robust, a good design. It's simple, a great little unit. I'm really pleased with it.

You know, I wouldn't have chose to live so close to it if I had any concerns about it.

AA-2

And about walking the talk, you know, we talk about environmental consciousness. Well, I was the project manager that worked on keeping the fish warm last winter, and I spent a couple hundred thousand dollars of our company's money keeping those fish warm. I know everybody thinks that the fish kill is about heating them up. No, it's not. The fish kill is all of these tropical fish that stick around in the wintertime. They should have gone south, but they didn't, but they stick around because we have this warm water, and if we need to shut down for maintenance in the wintertime, we've got a big problem, you know. The water on our discharge cools down to the same temperature as Barnegat Bay, and a good number of these species can't live at that temperature.

So if we don't do some way to provide supplemental heat, they ain't going to make it. So anyway, I was the project manager. I had a lot of fun with that, a lot of sleepless nights and days making sure that that went okay, but I was real pleased with the support that the company provided around that.

A couple of other things that just got stuck in my craw. I'm a private pilot, too. I keep my plane over here. My wife support all of my expensive hobbies, but I have a plane over here at the R.J. Miller about 11 miles from the plant, and I'm always incensed when people talk about little planes as being a danger to nuclear power plants. They are not. We don't have enough mass or fuel or anything on board to damage a robust structure like a nuclear power plant, and I don't care what part of it you hit.

You know, we could shut it down by getting tangled up in the power lines, but that's about it. So I always bristle a little when somebody makes the false accusations about us little guys flying our little airplanes around causing great fear and danger to everybody.

AA-3

Anyway, I've rambled long enough. I want to applaud the NRC for the work they're doing. As a very close resident to the plant, I'm very interested in it getting done right and being thorough about how you do it because my friends, neighbors, wife and family, we want to continue to feel safe being close to the plant.

Thank you.

(Applause.)

MR. CAMERON: Thank you, Wayne.

And now we're going to go to Roberto.

MR. WEINMANN: Well, thank you, everyone, for staying so long.

I just wanted to make a comment. I work in cancer research, and I develop drugs to fight cancer, and I would have the slightest idea that the plant or radiation would be the cause for any increase in leukemia or whatever, I wouldn't have come here. There is absolutely no evidence from the New Jersey Cancer Commission that there is an increase in rates in this area due to the plant. So I think you really have to look at the information and the data that is present. The same about autism.

U-1

I think a lot of hearsay is published and then read, and I think health concerns if they are not extinguishing our animal populations that are in the water that comes out of the plant, they're much less affecting us.

That's all. Thank you.

(Applause.)

MR. CAMERON: Thank you, Roberto.

Next we're going to go to Cindy, Cindy Zipf with Clean Ocean Action.

MS. ZIPF: Thank you.

I wasn't planning on saying anything tonight, but I couldn't resist. One of the questions that I wanted to ask during the question and answer period but there wasn't enough time was the process on how we were notified about the hearing.

Clean Ocean Actions staff scientists are Ph.D. in marine toxicology and also our attorney spent a great deal of time working and evaluating the Oyster Creek cooling water permit application to the Department of Environmental Protection, and we have been submitting comments and actually submitted comments during the scoping process here as well.

However, we learned about the hearing from the Asbury Park Press and the article that they wrote about the other hearing that occurred the other day on the safety issues.

P-1

So we are a coalition of 160-plus organizations that are concerned about marine water quality in the area, and when we're notified about these hearings, which is part of what the coalition is about, we distribute that to all the organizations.

Appendix A

So there wasn't any time for us to engage that coalition, make them aware of the hearing. So I'm very concerned about the process.

P-2 I'm also concerned about the quality of the process because in the comments that we submitted during the scoping period, we raised some very serious, significant issues. Some of them were raised today and considered small. We categorically disagree and will be submitting our comments in full during the process.

P-3 But one curiosity is that in the EIS that we've all been given copies of, in the discussion of radiological impacts of normal operations, the NRC failed to include the radionuclide (phonetic) impacts to the marine environment. We submitted substantial comments on that and specifically identified the fact that radionuclides have increased in the Barnegat Bay in the bottom sediments and the estuarine biota, and that the reactor released nucleides have been detected in the water, bottom sediments, benthic marine algae, seagrass, blue crabs, clams, bunker, winter flounder, summer founder, bluefish, and several other fish.

The organisms collected near Oyster Creek had the highest level of radionuclides, but detectable levels were found throughout the bay. Recent sediments collected near the discharge canal contained levels of Cobalt 60 that were 63 times higher than sediments collected at other locations within the Barnegat Bay.

Now, this issue did not even appear in this EIS that I could find. It wasn't in the section called radiological impacts of normal operations. It wasn't listed in any of the other sections. So I'm concerned that when we submitted to your office comments raising this as a concern, and if you wanted to blow off Clean Ocean Action's comments, that's one thing, but the studies that we obtained this information from were the same studies that you reference. So the information was available that this was an ecological risk, and if you wanted to sort of discuss it and label it small, okay, but you know, I'm concerned that we go to the trouble, a significant amount of trouble, to submit comments, to review these issues carefully, to review them scientifically, legally, and we want to make sure that the process will address our concerns and be fair.

So with that, we will be submitting our comments by the September 8th deadline and we trust, I guess, as best we can that they'll be considered.

(Applause.)

MR. CAMERON: Okay. Thank you, Cindy.

Let me just say that I'm sorry that you didn't get notice. It should have happened routinely because of your past participation, and we'll find out what happened and make sure it doesn't happen in the future. So thank you for calling that to our attention and also reiterating your comment.

I don't think that I introduced the senior NRC manager here earlier, Mr. Frank Gillespie, who is the Director of the Division of License Renewal at the Nuclear Regulatory Commission, and we've heard from all of the speakers tonight, and I was going to ask Frank to say some words to you before we adjourned and get together with you informally, and this is Frank Gillespie.

[Presentation by Dr. Gillespie]

MS. GUERRAZZI: Well, thank you. Thank you very much.

My name is Ms. Guerrazzi, and I just had a couple of questions that were not addressed this evening.

One of them goes to the fact that the nuclear plant sits on the Cohansee Aquifer, which supplies us with our drinking water, and in light of the fact that Toms River has some radiation in their wells, I wondered if the NRC considered the fact that the nuclear plant could potentially be polluting with radiation, invisible radiation our drinking water. And of course, that is of major concern.

BB-1

And the second comment that I had is that I would like to see the NRC consider in their impact statement the combination of alternate fuels or alternate energy sources, that being the combination of natural gas, solar power, wind power, and conservation.

BB-2

I think that if the area of conservation were given to people in the sense of a bonus, an energy bonus, for example, if people were seen as being cooperative with lowering their bills voluntarily, then maybe instead of penalizing people or not giving them any type of reinforcement for that, you could give them a bonus, like five bucks a month or two bucks or whatever it may work out to be, kind of like when you spend on your Discover card. You get a bonus back.

So I think that to just have negative ideas about the fact that we can't conserve, I think that when we as a nation come together like we did post 9/11 with the little flags and everybody getting together in support of each other in this great country of ours, I think that conservation may be more positive as one of the combination alternates as you can get.

But back to my original question. How is it that the nuclear plant can sit on the Cohansee Aquifer which gives us our drinking water? And I don't know if you can address that this evening, but certainly in your impact statement I would like to see that being addressed because I think that's a major, major point that was not brought up. I don't know. I haven't been to all of the meetings, but I think it's very crucial because obviously we as human being -- we're human beings before we're workers or before we're anything, and we need clean water that doesn't have radiation.

BB-3

Appendix A

MR. GILLESPIE: I think that kind of was brought up, and I think Mike kind of committed to look at that, and it was brought up, but not in terms of the aquifer. That's a spinoff actually, I think, of effluents and sediment.

Is it in there? Okay. Page 24. Let Mike get together --

MS. GUERRAZZI: Okay.

MR. GILLESPIE: -- and you can see what's in there.

Central New Jersey, as I understand it, has kind of a unique thing, and you've got radioactive water, and it's not from nuclear power. There's very high radon rates in many of the wells around here, and as I understand it, in fact, some of the water systems actually have to have holding tanks to allow the radon decay and decay products in New Jersey.

Yes.

PARTICIPANT: (Speaking from a location without a microphone.)

MR. GILLESPIE: Is that northern New Jersey?

PARTICIPANT: Yes.

MR. GILLESPIE: Okay.

PARTICIPANT: (Speaking from a location without a microphone.)

MR. GILLESPIE: Oh, that's okay. I'm going to get him and he's going to invite you up.

I'm just using that as an example, and I think Mike did respond to that, and he's got it in the book, and he'll get with you after and show you what we have written, and actually this is a comment period that's open for us to accept written comments also, and he did put up a slide, and he'll take them by E-mail, phone, mail or any other way.

With that I'm getting in trouble because I'm not allowed to be a facilitator. That's Chip's job. So again, thank you very much for coming out. I appreciate your patience, and please get us written comments, amplify them if you'd like. We do want them, and thank you very much. Thank you.

(Whereupon, at 9:40 p.m., the public meeting in the above-entitled matter was concluded.)

A.5 Letters and E-Mails Received on the Draft SEIS

is Mendiola - OCNGS EIS comments

m: Eugene Creamer <kb2gz@optonline.net>
<OysterCreekEIS@nrc.gov>
e: 09/11/2006 12:43 AM
ject: OCNGS EIS comments

6/16/06
71 FR 34969

12

RECEIVED

2006 SEP 11 AM 11:46

RULES AND REGULATIONS
DIVISION

Michael Masnik, Environmental Project Manager

Thank you for coming to the New Jersey Shore and explaining the NRC's Environmental Impact Statement process for the proposed Oyster Creek Nuclear Generating Station life extension. I commented at the July 12, 2006 public meeting and noted the following:

The Atomic Energy Commission issued a final EIS for Oyster Creek Nuclear Generating Station in 1974. Oyster Creek Nuclear Generating Station ascended to operation in 1969 and the EIS is an "after the fact" EIS.

Figure 2-3 (OCNGS site boundary map), on page 2-4, delineates both Oyster Creek and the South Branch Forked River west of the Station with dotted lines. (Usually, dotted lines indicate watercourses of an intermittent nature). The USGS quad for the area delineates both streams with solid blue lines, well beyond the Garden State Parkway to the west. The NJDEP maps indicate that both streams are watershed of the Pinelands National Reserve,

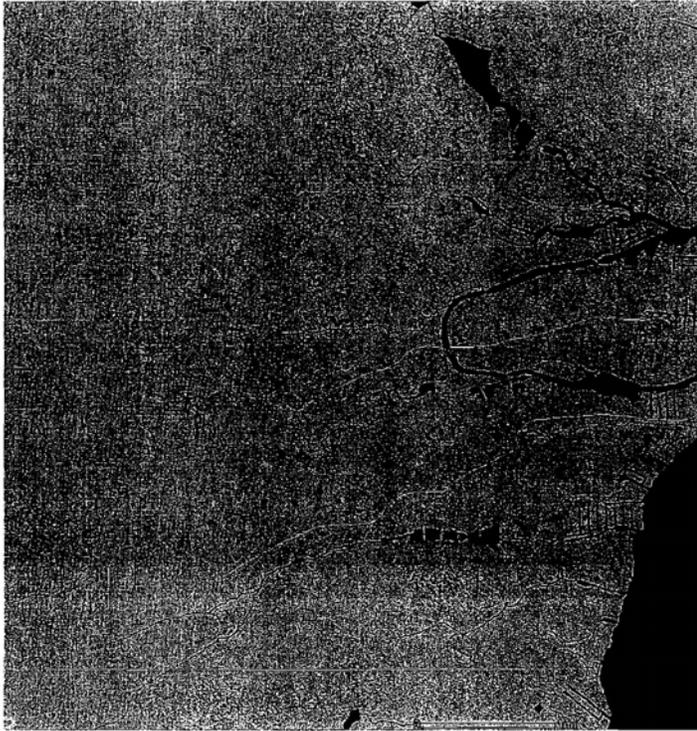
CC-1

CC-2

WSE Review Complete
complete = ADM-013

E-RIDS = ADM-03
Call = M Masnik
(HTM2)

Appendix A



- CC-3 Section 2.1.7 – Power Transmission System is silent with respect to the Oyster Creek Nuclear Generating Station output power transformer(s)..... Location, ownership, responsibility, secondary containment?
- CC-4 Section 2.2.2 – Water Use. The statement regarding “less than 100,000 gallons per day” on lines 27 & 28, page 2-19, is incorrect. The 100,000 gpd is a regulatory threshold in accordance with N.J.A.C. 7:19- 1.4 of the New Jersey Water Supply Allocation Rules. Also, Section 2.2.2 references NJDEP permits and metering for on-site water wells and is silent regarding the proposed continuous diversion of the entire South Branch Forked River fresh watershed (the product of a federal initiative). In my opinion, all water resources should be identified and quantified because the proposed action has direct impacts.
- CC-5 The discussion about the applicant’s alternative closed loop cooling system was shallow because it failed to link any air pollutant emissions with cooling water quality.

I appreciate the opportunity to comment on the draft EIS. Please contact me if you have any questions or require clarification.

Eugene Creamer
PO Box 543
Belmar, NJ 07719

kb2gz@arrl.net

Appendix A

From: Pat Crocker [mailto:mcroc47374@yahoo.com]
Sent: Thursday, July 13, 2006 10:47 AM
To: OysterCreekEIS@nrc.gov
Subject: Re Approval

DD-1

1. Approve it I live by the plant and feel safe.I am tired of people from out of our town complaining.Approve the extension PLEASE!!!

September 1, 2006

Chief, Rules and Directives Branch
Division of Administrative Services
Mail Stop T-6D59
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

By email: OysterCreekEIS@nrc.gov

Comments on draft Supplement 28 to GEIS (NUREG-1437) specific to application for 20-year license extension for the Oyster Creek Nuclear Generating Station

Thank you for the opportunity to offer comments regarding the NRC's preliminary decision that there are no environmental impacts that would preclude the renewal of the operating license for the Oyster Creek Nuclear Generating Station (OCNGS) in Lacey Township, NJ.

These comments are submitted by the GrassRoots Action Center for the Environment (GRACE), a non-profit organization that works with research, policy and grassroots communities to raise public awareness and promote solutions to preserve the planet for future generations. GRACE is involved in nuclear issues on a regional and national level, working in the public interest to ensure reactor safety. As a New York City-based organization, we are specifically concerned with the proposed license extension of OCNGS and its accompanying threats to regional security.

In summary, the draft Supplement 28 to GEIS does not adequately address environmental impacts to the region caused by continued operation of OCNGS.

- A twenty year extension to the operating license would bring the facility into the high-risk "wear-out" phase, dramatically increasing the risks for system failure and catastrophic release of radiation.
- The obsolete Mark 1 reactor containment design and elevated spent fuel pool would not meet current licensing standards and pose unacceptable risks to public health and safety.
- OCNGS has not demonstrated sufficient back-up power supply to ensure public safety in the event of station black-out or malfunction.
- OCNGS has among the highest rates in the country of routine releases of carcinogenic radioactive particulates.
- The location of OCNGS in a high population density area along the eastern seaboard would seriously hamper expedient evacuation in the event of an emergency and differentiate it as an attractive terrorist target.

EE-1

- Global warming and extreme weather events will increasingly render reactors inoperable and dangerous due to design of cooling systems and unreliable back-up power sources.
- OCNCS's once-through cooling systems use over a billion gallons of water a day, discharging it with elevated temperatures and chemical contaminants into an estuary of Barnegat Bay, exacting a serious toll on the marine ecosystem.
- The limited environmental scope of the supplemental EIS does not constitute the mandated "hard look" at potential impacts.
- OCNCS threatens endangered turtle species, which is inconsistent with stated objectives of other governmental agencies.
- Site-specific spent fuel storage considerations, such as pool overcrowding and dry-cask vulnerabilities, are substantial and should not be omitted from an EIS.
- The GEIS is outdated and incomplete. The possibility of terrorist attacks is not so "remote and speculative," and potential impacts should be included for consideration.
- New Jersey and regional consumers are not dependent on OCNCS for electricity generation.
- Concerns related to the NRC and ASLB review of age-related corrosion in the inaccessible and embedded region of the drywell liner component of the station's containment system are omitted from these comments as we await a full report specifically regarding this important component of containment integrity and provision for public health.

EE-2 In light of the seriousness of the risks associated with on-site spent fuel storage, increased potential for accidents at aging reactors, vulnerability and overcrowding of spent fuel pools, and the region's ability to economically replace the power generated by the plant, OCNCS should not be re-licensed. The specific design, location and attractiveness as a terrorist target of OCNCS distinguish relicensing concerns from other stations and should be thoroughly addressed through a site-specific SAMA review. While the supplement to the EE-3 GEIS is not required to discuss actual need for power, economic cost benefits of alternatives or any aspect of the storage of spent fuel or terrorist threat, we believe that these issues are central to decision making for the energy future of New Jersey and the regional PJM electricity grid.

EE-4

1. **High risk "wear-out" phase of operation:** Nuclear reactors are at the highest risk for failure as they approach the end of their engineered lifespan. A twenty year extension to the forty-year operating license would bring the facility into the high-risk "wear-out" segment of the bathtub curve¹

¹ The "bathtub curve" refers to the stage-based risk profile outlined in "U.S. Nuclear Plants in the 21st Century: The Risk of a Lifetime" by the David Lochbaum of the Union for Concerned Scientists, May 2004.

for failure risk. The GE Mark 1 BWR design of OCNGS is such that in the event of an accident the containment system's only mechanism to avoid a core meltdown would be the direct release of radioactive steam.

EE-4
(contd)

The regulatory track record shows that age-related damage at reactors is most-often identified only after they become self-revealing. Based on this track record, we can only assume that there is undetected age-related degradation occurring. Unfortunately, the current regulatory and inspection regime at the NRC has not been effective at identifying these serious threats to reactor integrity and enacting appropriate prevention and protection measures, nor has AmerGen demonstrated a satisfactory level of regard for public safety in their operations. Extending the operational license for OCNGS will dramatically increase the risks for system failure and catastrophic release of radiation.

2. **Mark 1 design:** The obsolete Mark 1 reactor design of OCNGS would not meet current licensing standards. This design-based defect means that in the event of an accidental buildup of pressure inside OCNGS, the only means to avert a core meltdown would be the intentional release of radioactivity directly into the environment. This design flaw poses unacceptable risks to public health and safety, and should not be grandfathered into a license extension. In light of this site-specific design flaw, how did the NRC conclude that there are no DBA threats at OCNGS beyond those discussed in the GEIS?

EE-5

In addition to the highly questionable safety of the Mark 1 containment design, its elevated spent fuel pool makes the station more vulnerable to and attractive as a target for sabotage or attack. The spent fuel cooling pool is open at the top and has no protective structure surrounding it. According to the National Academy of Sciences' report, a loss of coolant event in the spent fuel pool would have long-term contamination effects greater than those from the Chernobyl accident².

EE-6

3. **Back-up power:** In the evaluation of risks, loss of on-site power accounts for 40% of core damage frequency (CDF) risk (Ibid.). AmerGen has not proven their ability to provide sufficient back-up power in the event of station blackout for the renewal period (NJDEP, ASLB No. 06-844-01-L.R.).

EE-7

4. **Routine releases:** The supplemental EIS does not discuss the substantially above average routine releases of radioactivity into the environment from OCNGS. For airborne emissions of Barium-140, Iodine-131, Strontium-90 and Strontium-89, OCNGS was in the top ten ranked reactors in 2003. OCNGS ranked number one for Strontium-90, which

EE-8

² "Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report," National Academy of Sciences.

Appendix A

EE-8
(contd)

carries a half-life of 29 years, during 2003. The cumulative effects of these low-doses of radiation should be discussed in the EIS, as the National Academy of Sciences has found that there is no safe dose of radiation (NAS BIER IIV, 2005).

EE-9

5. **Central, high-density location:** The location of OCNGS in a high population density area along the eastern seaboard further differentiates it from other reactor sites. It is situated 50 mi east of Philadelphia and 60 mi south of Newark, with population growth rates for Ocean County among the fastest in the country. The severe impediments to successful and timely evacuation of residents and summer transients from the region as well as long-term environmental contamination and population displacement following an accident are not given just weight in the GEIS Supplement 28.

EE-10

6. **Reactor vulnerabilities to climatic fluctuations:** The impacts of Climate Change on water and atmospheric temperatures present a significant threat to the future operation of reactors with once-through cooling systems. OCNGS is a MARK 1 design Boiling Water Reactor model and utilizes water from the Forked River as its primary cooling agent. When the water drawn in from a lake or river is too warm to maintain a differential between steam and the condenser, the plant cannot operate. Therefore, as water temperatures continue to rise during summer heat-waves, OCNGS will become an increasingly unreliable and unsafe source of electricity generation.

Over the coming decades, global warming is likely to usher in additional threats to OCNGS operational safety in the form of flood waters from rising levels in the Atlantic Ocean which adjoins Barnegat Bay and increased vulnerability of back-up power to blackout from increased frequency and strength of extreme weather events, particularly hurricanes and Nor'easters. As temporary shut-downs from extreme heat and weather become more common, nuclear power will become less and less reliable, especially during peak demand across summer months, and more susceptible to accidents.

EE-11

7. **Marine impacts:** The marine impacts of once-through cooling systems are well documented across the country and far more damaging than initially thought. Waste water with significant concentrations of chlorine (595,500,000 gpd flow rate) and elevated temperatures by approximately 25% is discharged into Barnegat Bay, which is a registered U.S. protected estuary. Among the concerns which the EPA has identified for Barnegat Bay, degraded water quality, changes in abundance and diversity, closure of shellfish beds and loss of submerged vegetation can be at least partially attributed to the operations of OCNGS. Because Barnegat Bay is shallow estuary with limited tidal flushing, it is particularly sensitive to impacts and

inputs, natural or anthropogenic. Its ecosystem balance is dependent upon the interchange of fresh and salt water and warm and cool water, making for rich biodiversity that is commercially, recreationally and ecologically important to the region. The operations of OCNGS have already incurred substantial loss of habitat in the estuary, and continued operation promises to further the ecological disturbance to the area during the renewal period.

EE-11
(contd)

8. **Limited Environmental Scope:** The supplemental EIS for OCNGS discusses only 17 of the 108 fish and shellfish species associated with Barnegat Bay and among those that are addressed, current population estimates are given for only two, the hard clam and shipworms. This does not connote a thorough, "hard look" at the environmental impacts associated with the operation of OCNGS. Water temperature is the primary factor in hard clam spawning and it is reasonable to conclude that significant population decreases over the past few decades are due to temperature increases and a range of stressors, including deteriorated water quality, algal blooms and chemical contaminants, among which OCNGS plays a significant role as the nearest point source. Conversely, shipworms show increased rates of reproduction in higher water temperatures and greater salinity. Since the opening of OCNGS in 1969, a shipworm habitat has established itself in the creek, especially in areas influenced by the reactor's thermal plume. Oyster Creek is now infested with native and non-native shipworm species that are highly destructive to untreated wooden piling and boat hulls. Submerged aquatic vegetation and phyto- and zooplankton populations that provide critical habitat for many estuary species are in marked decline, largely due to frequent algal blooms and decreased water quality.

EE-12

9. **Endangered species policy inconsistent with other government agencies:** Five species of sea turtles that are listed as either threatened or endangered live in the vicinity of OCNGS, at which there have been 34 reported cases on impingement of these turtles with a mortality rate of approximately 50% (NUREG-1437, Supplement 28, p 2-51 – 2-53). The removal of these individuals from the sea turtle populations can have dramatic effects on overall species viability, especially as they are attracted to artificially warmed waters surrounding the reactor and therefore vulnerable to dangers posed by the intake structure. While the supplemental EIS says that there is no significant impact to the species from reactor take limits, extending the permissible killing of protected species through the renewal period goes against the stated objectives of other government agencies and legislation.

EE-13

10. **Spent fuel storage:** While supplemental EIS for license renewal is not required to address and aspect of spent fuel storage, there are significant site-specific consideration at OCNGS that cannot be overlooked or

EE-14

EE-14
(contd)

assumed sufficiently accounted for the in the GEIS. New Jersey as a whole has already reached a critical point in spent fuel storage capacity, OCNGS having surpassed storage pool capacity in 2002 and Hope Creek to exceed storage limits in 2008. If OCNGS is re-licensed for twenty additional years of operation, the NJ Public Interest Resource Group has calculated that it will generate an additional 640 metric tons of waste with nowhere to go, inevitably adding to operation costs and increased rates for consumers in the region. The dry cask storage system currently in place at OCNGS does not fully address the issue of spent fuel rod crowding in the pool or vulnerability of waste to attack. Waste generated during the proposed renewal period would necessitate building more dry cask units.

EE-15

11. Outdated and incomplete GEIS: The NRC is relying on a generic EIS that does not take current geopolitical realities or differentiations between reactor sites under consideration when deciding on potential accident risks. The 1996 GEIS for severe accidents at all reactors stated that the environmental impacts would be “small.” This was done before 9/11 and without looking at site-specific vulnerabilities and distinctions of targets. AmerGen did not include external sabotage in their ER (NUREG 1437 Supplement 28, 5-7).

EE-16

12. Terrorist attack impacts should be evaluated in EIS under NEPA: The recent decision of the Ninth Circuit court³ that the NRC “erred” in determining that the National Environmental Policy Act (NEPA) does not require the agency to consider potential environmental impacts of terrorist attacks at nuclear facilities. The determination that the possibility of terrorist attacks is not so “remote and speculative,” and that they should be included under NEPA items for consideration. Given the location and spent-fuel pool vulnerabilities of OCNGS, the risks of an attack are relatively high and therefore potential environmental impacts should be considered in a supplemental EIS. License extension and continued waste generation will heighten the already elevated risk of an attack.

EE-17

13. Electricity from OCNGS extraneous to regional demand: Finally, New Jersey and regional consumers are not dependent on OCNGS for electricity generation. The regional PJM grid has ample supply of excess capacity and statewide efficiency measures and increased reliance on and deployment of renewable energy sources will enable New Jersey to meet future electricity demand without compromising the safety or economy of the region. While the supplemental EIS is not required to discuss either the need for power or an economic cost/benefit analysis of alternatives, the extreme risk of an accident at OCNGS as it ages and implicit threats to

EE-18

³ San Luis Obispo Mothers for Peace v. Nuclear Regulatory Commission, No. 03-74628, 2006 WL 1511889 (9th Cir. June 2, 2006).

public safety and the regional economy posed by continued operation should be considered on a site-specific basis.

The NRC is required to take a "hard look" at direct and indirect impacts of license extension. Please consider the aforementioned comments for further review of the proposed license extension for OCNGS. We await your good faith response.

Sincerely,

GrassRoots Action Center for the Environment
215 Lexington Avenue, Suite 1001
New York, NY 10016

EE-18
(contd)

Doris Mendiola - Re: Supplementary Comments regarding waste accumulation

From: <Wmdecamp@cs.com>
To: <rwebster@kinoy.rutgers.edu>, <OysterCreekEIS@nrc.gov>
Date: 09/14/2006 1:06 PM
Subject: Re: Supplementary Comments regarding waste accumulation
CC: <Psturfels@aol.com>, <psturfels@cleanwater.org>, <gbur1@comcast.net>, <jtauro@comcast.net>, <jhuff@kinoy.rutgers.edu>, <pgunter@nirs.org>, <agarber@njpig.org>, <sleta@njpig.org>, <Crystal.Snedden@njsierra.org>, <jeffbrownnj@verizon.net>, <paulagotsch@verizon.net>, <Deadlinedon@yahoo.com>

Richard,

This may not be precisely pertinent to anything at hand, but there is something I would like you to know.

Ten years ago, when I was negotiating with GPU over spent fuel -- in relation to my appeal of a zoning board decision -- I learned quite a bit about used nuclear fuel.

A main point you may wish to keep in mind is that in terms of ease of transfer not all nuclear fuel is created equal. Over the years in which the fuel has been irradiated there has been a wide variety in the "cladding" of the fuel assemblies. Some of the assemblies are easy to move around; some may be extremely difficult or risky.

One of the reasons these guys may resist or stall on requirements to move to dry storage may be that a lot of the fuel is not safe or easy to move.

Willie deCamp

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E-RIDS = ADM-03
Acc = m. m... (HTM2)

09/14/2006

FF-1

CLEAN OCEAN ACTION
 PO Box 505
 Sandy Hook, NJ 07732
 732-872-0111

AMERICAN LITTORAL SOCIETY
 Highlands, NJ 07732
 732-291-0055

September 13, 2006

BY EMAIL AND 1st CLASS MAIL

Michael T. Lesar, Chief
 Rules Review and Directives Branch
 U.S. Nuclear Regulatory Commission
 Mail Stop T6-D59
 Washington, D.C. 20555-0001
OysterCreekEIS@nrc.gov

Subject: NUREG-1437: Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28, Regarding Oyster Creek Nuclear Generating Station Draft Report for Comment

Dear Chief Lesar:

Please accept these comments of Clean Ocean Action and the American Littoral Society on the above-referenced Draft General Environmental Impact Statement, Supplement 28 ("Draft GEIS") for Oyster Creek Nuclear Generating Station in Forked River, New Jersey ("OCNGS"). As confirmed by Harriet Nash of the Nuclear Regulatory Commission ("NRC"), public comments on the Draft GEIS are being accepted today because one of the NRC web pages listed today's date as the end of the public comment period.

Clean Ocean Action ("COA") is a broad-based coalition of conservation, environmental, fishing, boating, diving, student, surfing, women's, business, service, and community groups. COA's goal is to improve the degraded water quality of the marine waters off the New Jersey/New York coast. Clean Ocean Action identifies sources of pollution and mounts attacks on each source by using research, public education, and citizen action to convince our public officials to enact and enforce measures that will clean up and protect our ocean.¹

The American Littoral Society ("ALS") is a national, non-profit organization whose mission is to promote the study and conservation of coastal areas and marine ecosystems. ALS's work involves a combination of law, policy, and educational activities that introduce citizens to their marine environment, the effects of human activities taking place in the water and on the land, and to approaches for its conservation.²

Barnegat Bay is an important natural resource that supports populations of commercially and recreationally significant fish, shellfish, and rare and endangered wildlife species, as well as

¹ Visit <http://www.cleanoceanaction.org> for more information.

² Visit <http://www.littoralsociety.org> for more information.

Appendix A

GG-1
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serving as a vital component of New Jersey's tourist industry.³ The Bay is recognized by United States Environmental Protection Agency ("EPA") as one of 28 estuaries of "national significance." The fisheries (both fin and shellfish) of Barnegat Bay are an important economic resource: in 1991, freshwater and marine recreational fishing in New Jersey had a total economic impact of \$1.33 billion, which supported 16,754 jobs and generated \$630 million in retail sales to fishermen, \$402 million in salaries and wages, \$50 million in state tax revenues and \$46 million in federal income tax revenues. Oyster Creek, which flows into Barnegat Bay, "represents a high-use recreational fishery," as stated by then-New Jersey Department of Environmental Protection Commissioner Bradley Campbell.⁴

It is widely acknowledged that Barnegat Bay is a severely stressed estuary. These stresses are reflected in declining natural resources. Under the National Environmental Policy Act (NEPA"), 42 U.S.C. 4321 *et seq.*, the Nuclear Regulatory Commission ("NRC") is required to consider the environmental impact of the proposed re-licensing of the OCNGS for a period of twenty (20) years. Accordingly, the NRC must consider and disclose the ongoing damage to the marine environments of the Forked River, Oyster Creek, and Barnegat Bay caused by OCNGS. Additionally, the NRC must reevaluate the current conditions of operation of the OCNGS so that it might promote and advance the restoration and protection of this nationally significant estuary through the exercise of its authority; one of the purposes of NEPA (and by extension the NRC's obligations under it) is to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. 4321.

Indeed, a "hard look" at the environmental impacts of the OCNGS is mandated and warranted, particularly given its history of environmental abuses and the many forms of pollutants that emanate from the plant. Specifically, the OCNGS:

- impinges millions of organisms each year;
- kills hundreds of millions organisms each year by entrainment;
- has killed or impinged a significant number of endangered sea turtles;
- has caused several significant fish kills due to thermal shock;
- discharges into Oyster Creek an assortment of pollutants, including radionuclides, chlorine, suspended solids, heat, and petroleum hydrocarbons.

It is worth noting that all of these impacts or releases could be eliminated or greatly reduced if OCNGS replaced its antiquated once-through cooling system with a closed cycle cooling system, but the Applicant has resisted this federally mandate.

GG-2

While voluminous, the Draft GEIS fails to take a "hard look" at the environmental consequences of the proposed re-licensing and alternative courses of action. The NRC has a legal duty to gather and evaluate new information relevant to the impact of its actions. Where essential information regarding adverse impacts to the human environment is incomplete or missing, the NRC must obtain the information or evaluate the existing data upon theoretical approaches or research methods. However, these objectives are not met by the Draft GEIS. The

³ See <http://www.epa.gov/owow/estuaries/programs/barn.htm>.

⁴ NJDEP Press Release: [Oyster Creek Generating Station Fined for Water Violations and Fish Kill: NJDEP Seeks Compensation for Natural Resource Damages](#) (Dec. 12, 2002).

Applicant has failed to supply the NRC with such basic information as current annual impingement and entrainment mortalities. Moreover, the Applicant has failed to provide any recent data as to the populations of fish and other aquatic life in the Barnegat Bay system. Without this information, the NRC cannot reasonably determine the extent of the impact the OCGNS has had on this valuable estuary, let alone its anticipated impact over the next 20 years.

As detailed within, the Draft GEIS cites out-dated studies with glaring deficiencies for the purposes used therein. The Draft GEIS contains conclusions that are inaccurate, inappropriate, and unscientific. Some environmental impacts are either mentioned in passing without any meaningful discussion or analysis, while others are not mentioned at all. In addition, the Draft GEIS does not adequately review the implementation of a closed-cycle cooling system as an alternative to the present once-through system at OCGNS, which is mandated by federal law, strongly recommended by the State, and which can be designed to eliminate the concern of excessive salt deposition. Accordingly, COA and ALS believe the determination and conclusions contained in the Draft GEIS that the subject re-licensing will result in only a small impact, and that no viable alternative exists are not valid, insufficiently demonstrated and unsupported by necessary factual information, inappropriately narrowly drawn and based on methodologies discredited by the EPA. For the reasons stated herein, COA and ALS further believe these determinations to be arbitrary, capricious and unreasonable, and justify an action that will undoubtedly lead to increased environmental degradation of the Barnegat Bay system.

A. GENERAL COMMENTS REGARDING DOCUMENTATION AND ANALYSES USED BY THE NRC TO DETERMINE THE FINDINGS OF SMALL IMPACTS

The Draft GEIS concludes that the impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems are SMALL. We strongly disagree with this conclusion and the manner in which it was reached. The determinations on these Category 2 issues were made based on the staff's evaluation of three assessments: 1) The EA⁵ (1986) 316(a) and (b) demonstration, 2) Summers *et al.* (1989)⁶ Review ("the Versar Report") and 3) OCGNS NJPDES DRAFT permit and fact sheet ("Draft NJPDES Permit") from New Jersey Department of Environmental Protection ("NJDEP")⁷. It is important to note that these three documents cannot be considered different sources of information, as both documents 2 and 3 are reviews (not original research) that rely heavily on the flawed data presented in 1. The conclusions of SMALL are fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay Estuary since these data were collected and lack of analysis on cumulative impacts.

⁵ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

⁶ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection.

⁷ New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet.

GG-3

Appendix A

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The only original data used by the NRC (EA⁸ and JCPL⁹) to draw the conclusions that the OCNCS has a SMALL impact on fish and shellfish was found to be scientifically flawed and deficient by many different scientists and analysts, including the Versar Report¹⁰. The NRC¹¹ lists many of the deficiencies and problems of these studies, some of which are detailed in this Section A, but fails to address them or provide any explanation why these data are still being utilized. To the contrary, the NRC continues to cite the conclusions made in these studies. In addition, these limited data are over 20 years old (data from 1975-1978¹² and 1985¹³) and there have been significant ecological changes in the Barnegat Bay Estuary since that time.

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Moreover, in a nationwide study, the EPA made it clear that these older data sets are inadequate and new studies are needed to assess impacts. In the Federal Register dated July 9, 2004, the EPA stated:

“the methods for monitoring impingement and entrainment used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete, making quantification of impacts difficult in some cases. Recent advances in environmental assessment techniques provide new and in some cases better tools for monitoring impingement and entrainment and quantifying the current magnitude of the impacts.”¹⁴

Similarly, the United States Fish and Wildlife Service (“FWS”) provided specific comments to the NRC regarding OCNCS which also noted that the data were inadequate to assess impact. Specifically, the USFWS stated that “[t]he applicant’s assertion that the impacts of entrainment of fish and shellfish are “small” cannot be supported adequately with data that are most likely outdated.”¹⁵

The comments provided below further support the assertions of both the EPA and FWS that the data being used to assess impacts of operations at OCNCS are clearly outdated and inappropriate. Accordingly, COA and ALS find that the conclusions set

⁸ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

⁹ JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.

¹⁰ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection.

¹¹ Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station, Draft Report for Comments US Nuclear Regulatory Commission, NUREG-1437, Pages 4-10 through 4-25.

¹² JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.

¹³ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

¹⁴ Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624.

¹⁵ Draft NUREG-1437, Supplement 28 at A-22.

forth in the Draft GEIS are unsupported by sound science as they are based on studies that are flawed, deficient, old, and inadequate.

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A.1. Lack of Recent Data

As stated numerous times above, there are no data available on aquatic populations in the Bay for the past thirty (30) years and the limited, outdated data that are available is scientifically flawed.

GG-7

In addition, original hydrodynamic models of the thermal plume produced in the mid-1980s were extensively flawed and the consequent models produced by the Versar Report were based on these original flawed data. Therefore, these models should not have been used in the Draft GEIS. In order to rationally and reasonably assess the extent and magnitude of the thermal discharge to Barnegat Bay, reliable and current data, together with newly available modeling technology, should have been employed.

We are aware of the current intake-sampling program being conducted at OCNGS. However, it is irrelevant to this GEIS assessment because it will only provide data on impingement and entrainment at the plant. Without a concurrent biological assessment of bay-wide populations and communities (including benthos, plankton and nekton), it is impossible to assess the impacts of plant-generated losses to the populations and communities within the Bay. Moreover, COA and ALS are concerned that the current sampling program will have many of the same flaws and limitations as previous studies (see above) because the work-plan was not peer-reviewed, and like the previous studies, the program is not being performed by independent consultants. We note that the California Energy Commission recently concluded that “determining impacts is fundamentally a science issue, and should be independent of the regulations it serves, and their interpretations, except as the regulation specifies the impacts to be determined.” Based on this concept, “[r]ecent assessments (in California) have commonly relied on a technical working group composed of independent scientists plus representatives from relevant agencies, the consulting firms doing the study, the power plant owner/operator and, in some cases, environmental groups, to oversee study design, implementation, and data and impact analyses.¹⁶” We strongly recommend that this same judgment be applied to all OCNGS impact studies.

A.2 Scientific flaws and deficiencies in the available data

The Versar Report¹⁷ attempted to analyze the impacts of OCNGS operations on aquatic organisms using two available data sets, the JCPL 316(a) and (b) demonstration¹⁸ in 1975-1978,

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¹⁶ Issues and Environmental Impacts Associated with Once-Through Cooling at California’s Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.

¹⁷ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

and the EA study¹⁹ of 1985. The Versar Report found significant problems with these data, forcing them to throw out large portions of the data sets and make numerous assumptions about the remaining information. The modeling and conclusions conducted in the Versar Report are therefore based on a very small data set that was riddled with inconsistencies and inaccuracies. **The Draft GEIS affirms the inaccuracy of these data and reports, but nevertheless uses them to justify a finding of SMALL impacts, which is both environmentally irresponsible and scientifically unacceptable.**

Some of the serious problems with the data that are noted by the Versar Report and are clearly acknowledged in the Draft GEIS, include:

- Best Methods Available were NOT used to determine the following impacts²⁰ (most would have likely resulted in an underestimation of impacts):
 - Magnitude of Impingement losses
 - Annual Entrainment Losses
 - Avoidance Temperature/Thermal Plume Exclusion
 - Cold Shock/Heat Shock Mortality
 - Population/Community level Impacts of Plume on Fish and Invertebrates
 - Fish Kills associated with Heat/Cold Shock
 - Hydrodynamic Modeling;
- Population surveys of fish and invertebrates in the Barnegat Bay conducted in the 1970's and consequently used to determine the impact of losses due to OCNGS operations²¹:
 - Used inappropriate mesh sizes,
 - Did not calculate gear collection efficiencies,
 - Only surveyed during daytime,
 - Used inadequate sampling frequencies;
- Serious flaws in the methods used to determine entrainment losses, which would result in significant underestimation of losses²², including:
 - The use of only one of the discharge ports (despite differences in circulation pump operation between ports),
 - Use of discharge samples without any adjustment for mechanical destruction,
 - Sampling only from the condenser system, not the dilution pump system. Intake structures for these two systems are located at opposite sides of the intake canal

¹⁸ JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.

¹⁹ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

²⁰ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66.

²¹ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-65.

²² Id. Page IV-32.

and have different configurations, making differences in the number and types of organisms entrained likely;

- Entrainment losses were calculated assuming a sampling efficiency of 100%, when in fact they could have been as low as 13% due to extrusion and avoidance. Thus entrainment losses were most likely significantly underestimated²³;
- Mortality estimates for entrainment losses were not determined for all “Representative Important Species” identified by the NRC;
- The only two impingement mortality studies available, conducted between 1975-1978²⁴ and in 1985²⁵, used different methods for determining immediate mortality rates. “Major differences in impingement studies among sampling years include²⁶:
 - the type of traveling screens,
 - the mode of screen wash operation,
 - the length of impingement sampling time,
 - the frequency of sampling,
 - the time of day at which samples were collected.”
 - Adequate details on methodology were not provided
 - Identical test species were not used in all studies;
- Capture efficiency values “for annual impingement were also not corrected for intake screen collection efficiency” as they assumed 100% capture efficiency. When efficiency studies were finally performed in 1985, only one species was utilized and mean collection efficiencies were highly variable (90% in May and 53% in November). “Therefore, GPUN did not use best methods reasonably available for estimating screen efficiency²⁷”;
- Sampling gear deficiencies contributed to a significant underestimate of annual impingement mortality²⁸;
- Thermal Plume avoidance area was substantially underestimated²⁹;

²³ Id, Page IV-27.

²⁴ JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.

²⁵ EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

²⁶ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-15.

²⁷ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66. Page IV-20.

²⁸ Id. Page IV-19.

²⁹ Id. Page IV-42.

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- Hydrodynamic modeling “was a poor reflection of the dynamic conditions characterizing Barnegat Bay.” And it “underestimated the size of the plume and its associated isotherms.”^{30,}

A.3 Improper use of a draft document

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The Draft GEIS also references the Draft NJPDES Permit prepared by the NJDEP. This document is not final and is still under review. Therefore, it is inappropriate and improper for the NRC to use this document to draw conclusions.

During the public comment period for the draft permit, the NJDEP received numerous and substantive criticisms of the data and analysis, including comments submitted by COA, ALS and many other concerned organizations and individuals (see attached letter, which is incorporated herein and is to be made part of the record). One important finding set forth in the Draft NJPDES Permit, was the clear statement that NJDEP “is concerned about both impingement and entrainment losses, but is particularly concerned about the entrainment losses^{31,}” and therefore are requiring changes to OCNCS operations. As stated therein, NJDEP’s preferred alternative is to “[r]educe intake capacity to a level commensurate with the use of a closed-cycle, recirculating cooling system.”^{32,} **Indeed, these and several other statements by NJDEP in the Draft NJPDES Permit, have resulted in a NJDEP finding of significant impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems. These important conclusions directly and irreconcilably contradict the finding of SMALL environmental impacts set forth in the Draft GEIS.**

A.4 Misrepresentation of Dr. Michael Kennish’s statements

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The Draft GEIS also cites statements by Dr. Kennish³³ (2001) to support the conclusion that the impacts of impingement and entrainment are both SMALL. Dr. Michael Kennish is a marine research scientist at Rutgers University and holds a Ph.D. from William and Mary University. He is considered an expert in life history, ecology and behavior of fishes in the Barnegat Bay estuary. Dr. Kennish strongly rejects the use of his scientific review article to support the NRC’s conclusion. During his testimony at the GEIS public hearing³⁴ and again in his comments submitted on the GEIS (August 30, 2006), he clearly stated his conclusions and

³⁰ Id, page IV-42.

³¹ New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet Page 12.

³² Id.

³³ M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.

³⁴ Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

statements were taken out of context and are incorrect, including the following quotes made by Dr. Kennish in his August 30 comment letter:

- “I want to stress that this cited work is a review article, and the words quoted in the GEIS are taken out of context, thereby misconstruing the information.”
- “Therefore, I object to . . . the use of the three quotes from my published article in the context shown on pages 4-15, 4-21, and 4-51 of the GEIS.”

Accordingly, the reliance on the work of Dr. Kennish to support findings contained in the Draft GEIS of SMALL impacts is clearly misplaced.

A.5 Significant Ecological Changes in the Barnegat Bay Estuary

The Draft GEIS is incomplete because it does not evaluate several relatively new conditions in the Barnegat Bay system. All natural systems are dynamic, exhibiting constant change in biotic and abiotic factors over time, and the Barnegat Bay estuary is no exception. There have been substantial ecological changes within the Barnegat Bay estuary since the 1970's when the only bay-wide benthic and fisheries survey studies were conducted by OCNGS in the Barnegat Bay, including:

- The presence of substantial and persistent algal blooms of the species *Aureococcus anophagefferens*³⁵,
- An increase in macro-algal blooms³⁶,
- A significant decline in the extent of seagrass between the late 1970's and the mid-1990's, resulting in the reduction of essential fish habitat and the potential loss of commercially and recreationally important species³⁷,
- Hydrologic changes including substantial reduction in base-flow of freshwater in the Barnegat Bay since the mid-1980's³⁸,
- Increased eutrophication,³⁹
- Benthic community shift from a community dominated by filter-feeders to a deposit-feeder dominated benthic community,⁴⁰

³⁵ Gastrich et al. (2004) Assessment of Brown Tide Blooms, caused by *Aureococcus anophagefferens*, and contributing factors in New Jersey Coastal Bays: 2000-2002. Harmful Algae, Vol. 3, pp. 305-320.

³⁶ Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.

³⁷ Id.

³⁸ Id.

³⁹ M.J. Kennish (2001) Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280.

⁴⁰ Michael Kennish, personal communication, July 27, 2006.

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- New alignment of the South Jetty of the Barnegat Bay Inlet in 1991,
- Significant dredging and deepening of the Barnegat Bay Inlet from 1991-1993,
- Development has almost doubled since 1972 to 30% of the Barnegat Bay watershed in 2001⁴¹.

These changes are significant enough to impact fish and invertebrate populations in the Barnegat Bay and the impact of the substantial losses of aquatic organisms from the continued operation of OCNGS must be evaluated based on these present conditions. The Draft GEIS lists these changes, but does not evaluate the impacts of plant operations based on these new conditions in the Bay, as required.

Moreover, an adequate estimation of the plant's current impacts simply cannot be determined without concurrent monitoring of both OCNGS induced losses and bay-wide population surveys.

Therefore, the Draft GEIS is inappropriately narrow in considering the environmental context used to reach its determination of SMALL impacts.

A.6 Inappropriate and Outdated Conclusions Drawn from the Data

The Draft GEIS accepts several conclusions of the Versar Report that are no longer valid based on current knowledge and understanding of natural aquatic systems in the Barnegat Bay estuary. Some of these invalid conclusions are set forth below together with our corresponding comments (in italics).

- “There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource.” (Page 4-15) *There have been no Bay population surveys conducted over the past 30 years that would allow such a conclusion to be reached. NRC readily acknowledges this dearth of information in Section 2.2.5.3, which states that there are no recent population abundance data for 12 of the 14 species listed. The information provided on the remaining two species (blue crab and hard clams) are based on fisheries data, which is not an accurate or appropriate assessment of entire Bay-wide populations;*
- “Continued operation of OCNGS at the estimated levels of losses to representative important species populations, without modification to intake structures and/or operating practices, does not threaten the protection and propagation of balanced, indigenous populations.” (Page 4-21) *As stated above, without recent population data from Barnegat Bay, the impact of the OCNGS on aquatic populations in the bay cannot be determined;*

⁴¹ Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.

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- Population losses (for grass shrimp) will be rapidly compensated for by reproduction (Page 4-15). *Both the EPA⁴² and the California Energy Commission⁴³ came to separate conclusions that compensation does not reduce impacts from entrainment and impingement on adult populations and in fact, a population's natural compensatory ability may be compromised by impingement and entrainment losses in conjunction with all the other stressors encountered within a population's natural range;*
- Blue crab and winter flounder losses caused by OCNGS represent "a small fraction of the Barnegat Bay population" of those species (Page 4-15). *Without current population data on the aquatic organisms in the Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is without support and is no longer valid. This assertion is supported by the testimony of Dr. Michael Kennish at the July 12, 2006 GEIS public hearing⁴⁴ (herein "GEIS public hearing"), as well as in his written comments submitted to NRC on the GEIS (August 30, 2006). In his written comments, Dr. Kennish states:*

"The lack of bay surveys during the past three decades, therefore, undermines the fundamental conclusions of the GEIS with regard to minimal impacts of impingement and entrainment of the OCNGS on aquatic populations in the bay";

- Losses of bay anchovy and opossum shrimp "have little effect on higher trophic levels" (Page 4-15). *Without current community dynamics data for Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is also without support and is no longer valid. Again, our assertion is supported by the testimony and comments of Dr. Michael Kennish. In his written comments, Dr. Kennish states:*

"the GEIS assessment of cooling system impacts on the aquatic ecology of the bay cannot be accurate because population surveys in the bay have not been conducted concurrently with impingement and entrainment sampling at the OCNGS since 1977. Consequently, the conclusions of the GEIS regarding OCNGS impacts on aquatic communities in Barnegat Bay are invalid and irrelevant".

In reviewing the veracity of these conclusions stated in the Draft GEIS, it is important to bear in mind that **the only available bay-wide benthic and fisheries survey studies of Barnegat Bay were conducted in the 1970s. As recognized in the Versar Report, these**

⁴² Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624.

⁴³ Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.

⁴⁴ Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

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studies are “of limited value for assessing power plant effects⁴⁵.” Some of the deficiencies in these studies are detailed in Section A.2 above.

B. INADEQUACIES IN SPECIFIC SECTIONS OF THE GEIS

B.1 Important Fish and Shellfish near OCNGS (Section 2.2.5.3)

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The lack of available current data on important fish and shellfish in the Barnegat Bay, as noted throughout this section, further illustrates the deficiencies of the Draft GEIS and the validity of the conclusion stated therein that continued operations of OCNGS will only result in SMALL impacts on important aquatic resources of the Bay.

B.2 Discharge of Chlorine and Other Biocides (Section 4.1)

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The Draft GEIS contains a finding that discharges of chlorine are not expected to be a problem during the twenty (20) year license renewal period. The basis of this conclusion is not readily apparent, but is clearly not a scientific one. The substantial, negative impacts of chlorine and its byproducts have been consistently documented in the scientific literature and therefore need to be addressed in this GEIS. Chlorine is injected through each of the circulating pumps daily to prevent and remove fouling organisms such as bacteria.⁴⁶ Maximum chlorination occurs in the summer months to account for more rapid growth of fouling organisms.⁴⁷ To their detriment, fish, fish eggs and larvae, invertebrates, and zooplankton are most abundant during this time of increased chlorination. Some of the impacts related to chlorine and the chlorination process at OCNGS are detailed below.

- (1) Chlorine directly kills phytoplankton and zooplankton entrained in the cooling system and can impact organisms residing in Oyster Creek and surrounding waters.
- (2) Chlorine begins to be lethal to marine organisms at 0.01 mg/L⁴⁸ but tolerance is significantly lowered by high temperatures and physiological condition of the organisms.⁴⁹
- (3) OCNGS has a permitted daily maximum discharge limit of 0.20 mg/L of chlorine produced oxidants (CPOs)⁵⁰ into the discharge canal, 20 times higher than the lethal

⁴⁵ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66. Page IV-51.

⁴⁶ Assessment of the Impacts of the Oyster Creek Nuclear Generating Station on Kemp’s Ridley (*Lepidochelys kempii*), Loggerhead (*Caretta caretta*), and Atlantic Green (*Chelonia mydas*) Sea Turtles. (December 2004), NRC PDR ML# 050060037.

⁴⁷ M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.

⁴⁸ J.S. Mattice and H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. Journal of Water Pollution Control Federation, 48: 2284-2292.

⁴⁹ L.W. Hall Jr., D.T. Burton and S.L. Margrey (1981) Acclimation temperature: an important factor in power plant chlorination studies with larval white perch, *Morone americana*. Journal of Toxicological and Environmental Health. 7(6): 941-950.

chlorine limit of many estuarine organisms including striped bass, mummichogs, and bunker.^{51,52} One chlorine related fish kill resulted in the death of 500 Atlantic Menhaden in January of 1974.⁵³

- (4) Toxic residual organic compounds (chloramines), a byproduct of chlorination, persist in the discharge canal and effluent resulting in long-term exposure to fish and other aquatic organisms residing in the canal and plume area of Oyster Creek and Barnegat Bay.⁵⁴

In addition to chlorine discharges, the current NJPDES permit for OCNGS provides that a maximum daily limit of 15 ppm of petroleum hydrocarbons that can be discharged from five (of seven) of their outfall pipes.⁵⁵ The sources of this contaminant are not clear, however, petroleum hydrocarbons are harmful to marine life. These impacts should have been more thoroughly evaluated in the Draft GEIS.

Small concentrations of sediments and other solids are sucked through and discharged from OCNGS. Depending on the amount, total suspended solids (TSS) and total dissolved solids (TDS) can have negative impacts due to increased turbidity and solids concentrations in surrounding waters. After forty (possibly sixty, should the license be renewed) years of operation, TSS and TDS can have significant adverse affects on the marine environment, especially if the sediment is contaminated with radionuclides. These impacts should have been more thoroughly evaluated in the Draft GEIS.

The above individual impacts must also be examined from an ecosystem perspective, including cumulative effects, to fully appreciate the overall effect of OCNGS on the surrounding habitat. For example, survivability of fish populations and their effects on fish stocks and the effects on the ecosystem.

Because of the above demonstrable, significant, adverse impacts to the waters of New Jersey and their resources, and the fact that no studies have been conducted to determine the impacts of these ongoing releases to aquatic organisms, **the NRC lacks evidence to conclude that these discharges will have “no impact” during the renewal period and beyond.**

B.3 Entrainment of Fish and Shellfish in Early Life Stages (Section 4.1.1) and Impingement of Fish and Shellfish (Section 4.1.2)

⁵⁰ Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

⁵¹ J.S. Mattice and H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. *Journal of Water Pollution Control Federation*, 48: 2284-2292.

⁵² W.P. Davis and D.P. Middaugh (1977) A revised review of the impact of chlorination processes upon marine ecosystems: update 1977. In: R.L. Jolley (eds) *Water Chlorination: Environmental Impact and Health Effects-Volume 1*, Ann Arbor Science, Ann Arbor, Michigan, pgs. 283-310.

⁵³ M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*, SI 32: 243-273.

⁵⁴ Ambient Water Quality Criteria for Chlorine (January 1985), USEPA 440/5-84-030, 57 pgs.

⁵⁵ Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

GG-15

The NRC's conclusions that impacts of both entrainment and impingement are SMALL is fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay estuary since these data were collected and lack of analysis on cumulative impacts. These issues were fully evaluated in Section A of this comment letter.

We further note that the Draft GEIS does not appear to evaluate in any depth the immense Biological Oxygen Demand (BOD) loadings into the Barnegat Bay system from OCNGS. The organic loading discharged back into the Bay from the remains of entrained aquatic life averaged 17,000 lbs of oxygen demand per day during the summer months.⁵⁶ This daily BOD loading is equivalent to that of sewage treatment plant having a daily capacity of 25 million gallons. As this material decomposes, oxygen is removed from the Bay waters, contributing to and creating hypoxic conditions. This is a significant environmental impact that should have been evaluated in the Draft GEIS.

B.4 Heat Shock (Section 4.1.3), Distribution of Aquatic Organisms (Section 4.1) and Losses from Predation, Parasitism, and Disease Among Organisms Exposed to Sublethal Stresses (Section 4.1)

GG-16

As was stated above, the Draft NJPDES Permit⁵⁷ referred to in this section has not yet been finalized. The current, expired NJPDES permit allows for a temperature differential of 22°F (33°F under special circumstances) between the intake and discharge canal⁵⁸. Water temperature in the discharge canal is permitted to reach 110°F, which affects the behavior, physiology, and habitat utilization of aquatic organisms in Oyster Creek and Barnegat Bay.⁵⁹ In the Draft GEIS, outdated and scientifically flawed data are once again utilized to reach the conclusions of (1) SMALL impacts to aquatic organisms due to heat shock, (2) NO IMPACT of the thermal plume on distribution of aquatic organisms and (3) NO IMPACTS of losses from predation, parasitism, and disease among organisms exposed to sublethal stressors. There are significant data available on the impacts of OCNGS' thermal plume on local organisms, none of which are referenced in the Draft GEIS.

The elevated temperature in Oyster Creek and the surrounding waters of Barnegat Bay induces behavioral changes that have been documented in important managed species such as bluefish, fluke, winter flounder, and tautogs⁶⁰. Some of these behavioral changes include:

⁵⁶ C. O'Neil, D. Doyle, O. Donovan and E. Kearns. Biochemical Oxygen Demand (BOD) as a Measure of Entrainment Loss at a Nuclear Power Station. The Bulletin of the American Littoral Society. Volume 10, Number 3 (July 1977).

⁵⁷ New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, 2005.

⁵⁸ Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

⁵⁹ M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273.

⁶⁰ O. Donovan, D. Doyle, C. O'Neill and E. Kearns (1977) Thermal Plume Impact on Fish Distributions in Barnegat Bay. Bull. Amer. Lit. Soc. 10(3): 14

- a) Avoidance of parts or all of Oyster Creek by certain species during summer and early fall.⁶¹
- b) Attraction to parts or all of Oyster Creek during winter when they should have migrated out of the area due to cold temperatures. Failure to migrate can lead to large-scale mortality (due to thermal shock) when the plant experiences a planned or emergency shut down.
- (1) Records from January 1972 through December 1982 reported 2,404,496 fish were killed due to thermal shock including Atlantic menhaden, bay anchovy, bluefish, striped bass, and weakfish.⁶²
 - (2) An emergency shutdown on January 21, 2000 caused a 17°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 32°F resulted in the death of approximately 3500 fish including 2980 striped bass.⁶³
 - (3) An emergency shutdown on November 11, 2001 caused a 7°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 48°F resulted in the death of approximately 1407 fish.⁶⁴
 - (4) A scheduled shutdown on September 23, 2002 caused the water in the discharge canal to increase to 101°F in less than an hour and resulted in the death of approximately 6,000 fish.⁶⁵ AmerGen reached a settlement of approximately \$1 million dollars over this incident.⁶⁶
- c) Metabolic rate of organisms increases with increased temperatures resulting in decreased growth and survival,⁶⁷ especially during summer months when ambient water temperatures are at their peak.
- d) High water temperature decreases oxygen solubility in water and increases Biological Oxygen Demand (“BOD”) resulting in dangerously low dissolved oxygen concentrations in the water.

⁶¹ M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*. SI 32: 243-273.

⁶² M.J. Kennish, M.B. Roche and T.R. Tatham (1984) Anthropogenic effects on aquatic organisms. In: M.J. Kennish and R.A. Lutz (eds), *Ecology of Barnegat Bay, New Jersey*. NY: Springer-Verlag, pp. 318-338.

⁶³ Oyster Creek Nuclear Generating Station Fish Kill Monitoring Report (January 2000) NRC ML#003684420

⁶⁴ Oyster Creek 2001 Annual Environmental Operating Report (February 2002) NRC ML#020660222

⁶⁵ A. Cradic, Oyster Creek Generating Station fined for water violations and fish kills: DEP seeks compensation for Natural Resources Damages New Jersey Department of Environmental Protection news release (December 12, 2002), available for viewing at http://www.state.nj.us/dep/newsrel/releases/02_0131.htm

⁶⁶ P.C. Harvey, New Jersey reaches \$1 million dollar settlement with owner of Oyster Creek Nuclear Power Plant regarding fish kills caused by thermal discharge. New Jersey Office of the Attorney General news release (April 8, 2004), available for viewing at http://www.state.nj.us/dep/newsrel/2004/04_0408ag.htm

⁶⁷ T. L. Beitinger, W. A. Bennett, R. and W. McCauley, (2000) Temperature Tolerances of North American Freshwater Fishes Exposed to Dynamic Changes in Temperature. *Environmental Biology of Fishes*, 58(3):237 – 275.

GG-16
(contd)

- e) Calcification or thermal loading in the discharge canal and Oyster Creek directly interferes with physiological processes of biota, such as enzyme activity, feeding, reproduction, respiration, and photosynthesis. Less conspicuous, indirect effects, which are difficult to quantify, include greater vulnerability to disease, to changing gaseous solubilities, and to chemical toxicants associated with thermal enrichment.⁶⁸

Both the NJDEP draft permit⁶⁹ and Versar Report⁷⁰ found that the extent and width of the thermal plume often violates New Jersey surface water quality standards. These violations should automatically disqualify any finding of SMALL impact, because these standards are essential for the protection and propagation of aquatic life in the Barnegat Bay estuary. We further note that in other sections of the Draft GEIS, violations of state or federal standards are considered as MODERATE impacts.

B.5 Threatened or Endangered Aquatic Species (Section 4.6.1)

CG-17

OCNGS has significant impacts on aquatic species, including endangered and threatened species. Plant records indicate 34 impingements and 14 mortalities of endangered sea turtles since 1992.⁷¹ These data include the following species-specific incidents:

- 23 impinged Kemp's Ridley Sea Turtles with nine (9) mortalities,
- Seven (7) impinged Loggerhead Sea Turtles with two (2) mortalities, and
- Four (4) impinged Green Sea Turtles with one (1) mortality.

We note that the Kemp's Ridley Sea Turtles are the most endangered and most rare sea turtle. The re-licensing of OCNGS will result in the continued killing and harassing of this species.

In 1993, NOAA required a formal consultation on the operation of the OCNGS due to seven (7) takes of threatened and endangered sea turtles over two summers (1992 and 1993). Since then, OCNGS has met or exceeded their Incidental Take Allowance ("ITA") for endangered sea turtles four (4) times. Most notably, OCNGS exceeded their annual incidental take in 2004 when eight (8) juvenile Kemp's Ridley Sea Turtles (of indeterminate sex) were impinged and three (3) were killed in the three-month period from July 4 to September 23.

Despite this poor performance, in 2005, the National Marine Fisheries Service ("NMFS") inexplicably increased OCNGS's annual take limit of Kemp's Ridelys to eight (8) (with no more

⁶⁸ M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273.

⁶⁹ New Jersey Department of Environmental Protection/New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet

⁷⁰ Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-

⁷¹ Assessment of the Impacts of the Oyster Creek Nuclear Generating Station on Kemp's Ridley (*Lepidochelys kempi*), Loggerhead (*Caretta caretta*), and Atlantic Green (*Chelonia mydas*) Sea Turtles. (December 2004), NRC PDR ML# 050060037.

than four (4) mortalities).⁷² While Section 4.8.1 of the Draft GEIS suggests that OCNGS's Incidental Take Allowance was raised by NOAA due to an increase in Kemp's Ridley population abundances, there is no evidence that this species has rebounded. Kemp's Ridley retains its current status as being the most endangered of all the sea turtles. Rather, it appears that NMFS raised the take limit to accommodate mortalities that occur at the plant, as NMFS acknowledged that the continued operation of the plan may adversely affect this endangered species.

In the latest (2005) Section 7 Consultation, NFMS concluded that "the continued operation of the OCNGS may adversely affect but is not likely to jeopardize the continued existence of endangered Kemp's Ridley, green, or threatened loggerhead sea turtles" **These findings contradict the conclusion (said to be based on the 2005 consultation) in the Draft GEIS that impacts on threatened or endangered sea turtles from continued operation of OCNGS would be SMALL. Based on the information provided by NMFS, it is more appropriate to conclude the operations of OCNGS will at least have a MODERATE impact based upon the NRC's definition of same. (See Draft GEIS at 1-3)**

B.6 Cumulative Radiological Impacts (Section 4.8.3)

The Draft GEIS fails to adequately examine the cumulative impacts of radionuclides released from OCNGS on aquatic organisms utilizing Barnegat Bay. Reactor-released radionuclides from OCNGS have accumulated in bottom sediments and the estuarine biota since December 1969 when the facility commenced operation.⁷³ These radionuclides (⁶⁰Co, ¹³⁷Cs, ⁵⁴Mn) bioaccumulate throughout the estuarine food web, and have been detected in water, bottom sediments, benthic marine algae, seagrass, hard clams, blue crabs, bunker, winter flounder, summer flounder, bluefish, and several other fish.⁷⁴ Organisms collected near Oyster Creek had the highest levels of radionuclides but detectable levels were found through out the bay.⁷⁵ Recent sediments collected near the discharge canal contained levels of ⁶⁰Co that were up to 63 times higher than sediments collected at other locations within the Barnegat Bay-Little Egg Harbor estuary.⁷⁶

There have been several reported releases of radionuclides into the environment since operations began at OCNGS forty years ago. There are measurable concentrations of several radioactive elements in the aquatic environment at this time and considering the aging infrastructure, additional releases are likely should the plant continue to operate for another 20 years. Thus, there is considerable justification to examine cumulative impacts of past and continued exposure to radionuclides on aquatic organisms utilizing Barnegat Bay.

⁷² National Marine Fisheries Service's Biological Opinion on the impact's of Oyster Creek Nuclear Generating Station located near Forked River, New Jersey, on endangered and threatened species. National Marine Fisheries Service, Northeast Regional Office, Sept. 22, 2005

⁷³ M.J. Kennish (2001) Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280.

⁷⁴ Id.

⁷⁵ R.L. Blanchard and B. Kahn (1979) Abundance and distribution of radionuclides discharged from a BWR nuclear power station into a marine bay. Nuclear Safety 20: 190-205.

⁷⁶ F.C. Moser and R.F. Bopp (2001) Particle-associated contaminants in the Barnegat Bay-Little Egg Harbor Estuary. Journal of Coastal Research, SI 32:229-242.

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GG-18

B.7 Cumulative Impacts on Aquatic Organisms (Section 4.8.1)

Many different factors must be considered when attempting to analyze cumulative impacts, including natural fluctuations in populations, the different stressors that interact to impact the system, and community-level effects. None of these analyzes were conducted by NRC in order to reach a conclusion of SMALL cumulative impact of plant operations. Moreover, the data does not exist at this time to conduct such an analysis.

Analyzing cumulative impacts at the population level requires an understanding of the natural fluctuation of a population in relation to the combined effects of all the different losses associated with operations at OCNGS (from impingement, entrainment, thermal pollution, degraded water quality, etc.) over the lifetime of the plant. These total losses are incurred on the population every year with some consistency, yet natural aquatic populations are rarely stable, and according to Dr. Kennish, can fluctuate up to 300% annually⁷⁷. In years when a population is substantially reduced due to factors unrelated to plant operations, the additional impact of mortality from OCNGS may be much more substantial. Multiple years of poor recruitment of a population, combined with the consistent take from OCNGS operations, can ultimately lead to population crashes. For example, his scenario needs to be further explored in light of the hard clam fisheries collapse that has been documented in Barnegat Bay, especially considering that this species is consistently entrained by the once-through cooling system of OCNGS.

Many of the stressors (see Section A.3 above) that currently impact the Barnegat Bay are listed in this section, but the NRC fails to analyze the role of OCNGS-induced impacts in light of these issues. Although operations at OCNGS may not necessarily be responsible for all the stressors listed, the ongoing mortality caused by the plant could have a much more substantial impact on populations and communities, considering the additional impacts from all of these stressors. Therefore, an important part of assessing cumulative impacts is the relative contribution of once-through cooling systems to overall population decline. Cumulative anthropogenic sources of mortality can exceed the sustainability of the population, so that even a SMALL reduction in abundance of a species from OCNGS operations, can be enough to reduce that species below a threshold, thus resulting in a disproportionately large reduction in the population⁷⁸.

Finally, cumulative impacts must also take into account the impact to the community structure of Barnegat Bay. OCNGS operations target specific species based on size and habitat utilization. As these species continue to endure consistent losses, their decline in abundance may alter predator/prey interactions. Predators may move into other areas where their preferred prey is more prevalent leading to a shift in community structure. Dr. Kennish has reported such a change in benthic community structure, with a shift from a filter-feeder dominated community to a deposit-feeder dominated community.⁷⁹ The statement that "there is no evidence to suggest that the operation of the OCNGS cooling-water system has significantly altered the marine and

⁷⁷ Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

⁷⁸ Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005

⁷⁹ Michael Kennish, personal communication, July 27, 2006.

estuarine food web in Barnegat Bay or resulted in significant changes in phytoplankton or zooplankton species composition” is completely unsubstantiated considering no bay-wide fisheries or invertebrate surveys have been conducted in Barnegat Bay for over thirty (30) years.

GG-19
(contd)

The Draft GEIS states, “[i]t is likely that plant operations contribute to some of the environmental concerns found in Barnegat Bay; the precise contribution, however, cannot be quantified without long-term studies of the estuary.” Despite this clear and acknowledged lack of understanding, the Draft GEIS still concludes that “the cumulative impact of continued operation of the OCNGS once-through cooling system on aquatic resources in Barnegat Bay estuary would be SMALL.” This conclusion is (1) unsubstantiated, and (2) apparently based on the Versar Report and statements made by Dr. Michael Kennish, neither of which provide a proper basis for the reasons set forth in Sections A.2, A.4 and A.6 above.

C. COMMENTS RELATING TO THE EVALUATION OF THE CLOSED CYCLE COOLING ALTERNATIVE (Section 8.1.1.1)

The Draft GEIS reaches the untenable and unsupported conclusion that the alternative of closed cycle cooling would have MODERATE environmental impacts—a greater degree of harm than found for the present operation of OCNGS. Closed-cycle cooling would drastically reduce the amount of water (and species) withdrawn from Forked River by OCNGS. A closed-cycled cooling system would reduce the amount of water withdrawn by the OCNGS by as much as 96%.⁸⁰ The mortality of species entrained by OCNGS would be reduced by approximately that same percentage. By way of example, where certain once-through cooling systems entrain 3.65 million organisms per year, replacing that system with a closed-cycle cooling system would reduce the number of organisms entrained to as low as 180,000 organisms.⁸¹ This dramatic reduction does not even account for the number of organisms spared from thermal shock, impingement, and polluted discharge by the closed-cycle cooling system. One study has found that the conversion from a once-through cooling system to a closed-cycle cooling system reduced fish impingement by over 95%.⁸²

GG-20

Moreover, Section 316(b) of the federal Clean Water Act requires that the “location, design, construction, and capacity of cooling water intake *structures* reflect the *best technology available for minimizing adverse environmental impact*.”⁸³ It is well established that closed-cycle cooling is the “best” technology, because, as the NJDEP has recognized, it is “the only cooling water intake structure technology available to [OCNGS] to reduce entrainment.”⁸⁴ Closed-cycle cooling is certainly “available,” since 73 power plants have implemented this technology by converting from once-through to closed-cycle systems.⁸⁵

GG-21

⁸⁰ EPA, Phase II Rule Technical Development Document, at 4-1 (available at www.epa.gov/waterscience/316b/devdoc/ch4.pdf).

⁸¹ *Riverkeeper, Inc. v. U.S. Envtl. Protection Agency*, 358 F.3d 174, 195 fn. 22 (2d Cir. 2004).

⁸² Benda, Robert S., et al., *Comparison of Fish Impingement at the Palisades Nuclear Power Plant for Once-Through and Closed Cycle Cooling*, Indiana Academy of Science (Vol. 85, 1975).

⁸³ CWA § 316(b), 33 U.S.C. § 1326(b) (emphasis added).

⁸⁴ NJDEP Fact Sheet on Proposed Permit for OCNGS, p. 12.

⁸⁵ EPA, Phase II Rule Technical Development Document, Chapt. 4 (available at www.epa.gov/waterscience/316b/devdoc/ch4.pdf).

Appendix A

GG-21
(contd)

This portion of the Draft GEIS, however, appears to be primarily based on an analysis conducted by URS Corporation for AmerGen⁸⁶, the plant operator, to demonstrate that conversion of OCNGS to a closed-cycle cooling system is “unavailable” technology for the OCNGS. The opening paragraph of the AmerGen document states, “This report was written with the intended audience being the permit writer [NJDEP] and is not intended as a detailed design engineering report.” The analysis was not peer-reviewed, does not include all the available alternatives for cooling tower options, and is an obvious attempt to allow OCNGS to maintain its current once-through cooling system. Some of the environmental and water quality issues with cooling towers raised in the AmerGen report, and subsequently restated in the Draft GEIS, have been substantially overestimated when compared with analyses conducted by other agencies and consulting firms, including plume formation, salt-drift, and discharge water quality.^{87,88,89} The Draft GEIS fails to consider available technologies that would satisfactorily address and/or essentially eliminate all three (3) of these concerns. In addition, the NRC did not fully explore all of the available alternatives to once-through cooling, nor did they question the analyses performed by AmerGen on the five other closed-cycle cooling systems they investigated. There are significant problems with AmerGen’s arguments/issues used to eliminate other available cooling tower options that would have less of an impact on the environment, such as dry cooling towers.

GG-22

One of the most important and unsubstantiated conclusions put-forth by AmerGen and accepted by NRC, is the statement that the use of a hybrid wet-dry cooling tower (AmerGen’s preferred cooling tower option) would result in a MODERATE impact to air quality from salt emissions. Such conclusions have been perpetuated by many different power plants attempting to circumvent the EPA Phase I and II requirements, and emphatically rejected by the EPA and other regulatory agencies. The issue of salt drift from power plants utilizing saltwater has been shown in theory and practice to be of small significance and if necessary, is easily mitigated⁹⁰. In addition, according to the EPA, “[m]odern cooling towers utilize advanced fill materials that have been developed to minimize salt or mineral drift effects. The Agency estimates that the typical plant installing a cooling tower as a result of the requirements of this rule will equip the tower with modern splash fill materials.⁹¹” The Draft GEIS must evaluate such salt-mitigation technologies if it is to take a “hard look” at the available alternatives.

GG-23

Another important alternative that was not evaluated in the Draft GEIS nor by AmerGen was the use of wastewater from the Central Water Pollution Control Facility (current provider of wastewater treatment for the plant) as the source water for the cooling towers. The substantial reduction in water usage of cooling towers makes the utilization of wastewater a viable alternative. The reuse of the discharge from this facility would not only eliminate issues related

⁸⁶ URS Corp. (2006) Determination of Cooling Tower Availability for Oyster Creek Generating Station. Prepared by URS for AmerGen Energy Co.

⁸⁷ Issues and Environmental Impacts Associated with Once-Through Cooling at California’s Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.

⁸⁸ Evaluation of Cooling System Alternatives Proposed Morro Bay Power Plant, Produced by Tetra Tech for the San Luis Obispo Regional Water Quality Control Board, May 2002.

⁸⁹ EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects

⁹⁰ EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects

⁹¹ Id



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RULES AND DIRECTIVES
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Dear Sir or Madam:

In accordance with Section 309 of the Clean Air Act and the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) has reviewed the Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plant, Supplement 28 (draft SEIS): Oyster Creek Nuclear Generating Station (CEQ # 20060246). According to the draft SEIS, the current operating license for the Oyster Creek Nuclear Generating Station will expire in April 2009. The proposed Federal action would renew the current operating licenses for an additional 20 years.

This draft SEIS was prepared as a supplement to the Nuclear Regulatory Commission's (NRC) 1996 Final Generic Environmental Impact Statement (GEIS), which was prepared to streamline the license renewal process on the premise that in general, the ~~environmental impacts from re-licensing nuclear power plants are similar. That GEIS~~ proposed that NRC will develop facility-specific SEIS documents for individual plants as the facilities apply for license renewal. EPA provided comments on the GEIS during the development process in 1992 and 1996.

The Oyster Creek Nuclear Generating Station (OCNGS) is located in Ocean County, New Jersey, on the confluence of the South Branch of the Forked River and Oyster Creek, adjacent to Barnegat Bay. The facility has one unit that is a single boiling water reactor with a power rating of 1930 megawatts of thermal energy and 640 megawatts of electrical power. Plant cooling is provided by a once-through circulating water system that draws water from the Barnegat Bay via the South Branch of the Forked River and discharges to Oyster Creek.

Based on the review of the Oyster Creek Nuclear Generating Station draft SEIS, the EPA has rated the project and document "Environmental Concerns- insufficient information" (EC-2). Our most serious concern is how the OCNGS will comply with Section 316 of the Clean Water Act and the how OCNGS will minimize the impacts due to entrainment and impingement of fish and shellfish. We are also concerned with the impacts to the Oyster Creek and Forked River aquatic systems from heat shock and the lack of a consistency determination with New Jersey's Coastal Zone Management Plan. Also, we recommend that the final SEIS address opportunities for pollution prevention and waste recycling.

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HH-2

HH-3

Aquatic resources:

Our first and foremost concern is with the draft SEIS's use of outdated data and the lack of a complete evaluation of the environmental effects from the continued operation of the facility. While other regulations may not require the regular collection of data and information, these in no way influence the NEPA requirement to collect data to accurately and appropriately analyze, evaluate, and disclose the impacts from a proposed action. For example, a serious shortcoming of the document is that it relies upon 20 to 30 year old aquatic resource data to inform the public and decision makers regarding the facility's impacts for the next 20 years to come. Rather than relying on nearly 20 year old data from other studies, the draft SEIS should have evaluated the present and continued effects from altered water quality, temperatures, currents, as well as entrainment and impingement, and put that evaluation in the context of the effects not only on Oyster Creek and the South Branch of the Forked River, but on the larger Forked River and the Barnegat Bay ecosystem. The draft SEIS also did not have a sufficient or current evaluation of the facility's effects on species that are residents of the area (i.e., the discharge canal and Oyster creek) around the facility, such as hard clam, blue crab, American eel, and herring and the important aquatic habitat.

HH-4

Nonetheless, this facility's impacts to aquatic ecosystems over the course of its operation have been significant, contrary to the statements in the draft EIS. Start-up and operation of OCNCS reversed the flow of the South Branch of the Forked River away from Barnegat Bay, changed the salinity of the water and destroyed all of the brackish and fresh-water habitat in the lower-reach of the Forked River and Oyster Creek. Given these and other significant changes to the aquatic environment and the representative species, the facility's impacts cannot be appropriately described as small. Also, since there has not been any recent data collected to support the claims of small or minimal impact, we find these conclusions to be unsupported and incorrect. However, we understand that NRC and AmerGen are currently conducting studies, at the request of the New Jersey Department of Environmental Protection (NJDEP) that are intended to support the New Jersey Pollution Discharge Elimination System (NJPDES) permit application. We wholly support that effort as well as the U.S. Fish and Wildlife Service's recommendation that at least 3 years of biological sampling studies should be performed. We expect that since this information will be new and potentially significant and will be used to inform the decisions on operations and mitigation measures, it will be included in the final SEIS.

HH-5

HH-6

HH-7

Entrainment and impingement:

The EPA's new rules under Section 316(b) of the Clean Water Act (in 40 C.F.R. § 125) require OCNCS to reduce its entrainment of fish and shellfish in early life stages. The draft SEIS discusses the new rules that are in effect, and states that there is an application for renewal of the NJPDES permit. To be in accord with the new 316(b) regulations, the facility has proposed mitigation measures to minimize these impacts and NJDEP has discussed these measures in the draft NJPDES permit and summarized those provisions and findings in the Fact Sheet for the permit.

HH-8

Appendix A

HH-9

In the draft NJPDES permit, the NJDEP identified that the preferred alternative for compliance with the 316 (b) rules is a cooling tower. Several cooling tower designs were discussed in the draft SEIS with a linear hybrid mechanical draft design selected as the optimal one for OCNCS. The draft SEIS states that there would be impacts to air quality, predominantly particulate matter in the form of salt, from the operation of a cooling tower. We agree with the draft SEIS that the appropriate control of the PM₁₀ emissions would be a drift eliminator which is considered the Best Available Control Technology (BACT). However, we are very concerned that the draft SEIS states that even with the optimal drift eliminator efficiency the predicted downwind PM₁₀ concentrations would still exceed the ambient air quality standard and the Prevention of Significant Deterioration (PSD) class II increment. With the exception of indicating which model was used, the draft SEIS did not discuss how this conclusion was reached and therefore, we ask that NRC provide to us the information and assumptions that were used for the model, before the release of the final SEIS. We can offer technical assistance to NRC and the applicant to evaluate and further reduce these effects. Nonetheless, we believe that these impacts can be managed.

HH-10

HH-11

With this in mind, we support and strongly recommend the selection of a cooling tower as the mitigation measure used to comply with Section 316(b). Such a system would reduce the water use from the Forked River by 70 percent and have a corresponding reduction of entrainment and impingement of aquatic life thereby achieving the 80-95% reduction goals of the regulation. The impacts from thermal discharges and heat shock would also be substantially reduced. Given these benefits to the aquatic ecosystem and the limited effects to air quality, a cooling tower with appropriate air pollution control would be environmentally preferable.

HH-12

We also recommend that the final SEIS not view entrainment and impingement as mutually exclusive impacts, but instead assess the combined effects of entrainment and impingement, particularly since both impacts substantially affect a discrete number of species.

Heat shock:

HH-13

Since OCNCS began operation there have been a number of significant fish kills in Oyster Creek and Barnegat Bay due to heat shock. Unfortunately, with the exception of the fish kill documentation and the subsequent monitoring that was required by NJDEP, there have been no recent studies that examine the long-term effects of heated water entering a small, confined system such as the discharge canal and Oyster creek. Also, there is a question as to whether the thermal plume has a greater effect on Barnegat Bay than has been suspected. We strongly recommend that new and current studies should be done for representative species and those results be presented in the final SEIS. The studies should address the less conspicuous ability of heat to preclude the use of affected areas by temperature sensitive species, attract and expose organisms to areas of elevated temperature during spawning periods, and expose eggs and larvae to water temperatures far exceeding naturally ambient levels.

The draft SEIS also contains the conclusion that the potential impacts to fish and shellfish due to heat shock are small. As we have stated before, we believe that these kinds of conclusions are premature, particularly in this instance where current studies to determine the significance of the impact need to be done. The final SEIS should refrain from that terminology until that has been proven to be the case.

HH-13
(contd)

Coastal Zone Management:

We are concerned that OCNGS does not have a federal consistency determination demonstrating compliance with New Jersey's Coastal Zone Management Plan. The draft SEIS did not discuss the contents of the consistency determination or the reasons for its rejection by NJDEP other than to say that the application was found to be incomplete. Oyster Creek should have a federal coastal zone management plan consistency determination for inclusion in the final SEIS or at the least in the Record of Decision.

HH-14

Waste recycling:

One of the Department of Energy's (DOE) goals in its 2005 budget is to identify opportunities for recycling spent fuel, and a DOE lab is testing a process to make reprocessing spent fuel more viable. However, the draft SEIS did not address the issue of spent uranium fuel recycling in its discussion of the Uranium Fuel Cycle. Recycling spent fuel reduces the need to mine more uranium, which has significantly damaging effects to the environment, and reduces the security risk to the facility. Since there has been significant progress in the area of recycling spent uranium fuel from commercial nuclear power plants, we believe that the final SEIS should address the issue of recycling and the likelihood that Oyster Creek may employ some recycling technology in the future.

HH-15

The draft SEIS was also silent on the issue and options for pollution prevention (P2). The final SEIS should discuss the internal and external processes and the waste streams that would be candidates for pollution prevention technologies. Some P2 opportunities can range from actions as simple as specific landscaping and reduction of herbicides within OCNGS grounds to the reduction of sanitary or hazardous (non-radioactive) waste generation rates. We encourage consultation with the DOE's Pollution Prevention office to obtain recommendations that would fit with the processes at Oyster Creek.

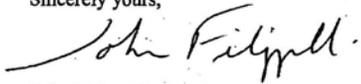
HH-16

We appreciate the opportunity to comment on the draft SEIS. We look forward to receiving the information regarding the cooling tower PM₁₀ emissions modeling and discussing those results with you. Upon completion of the final SEIS please send three

Appendix A

copies to this office. My staff is available to discuss these comments and provide assistance in responding to these issues. Please feel free to contact David Carlson, at (212) 637-3502 if you have any questions.

Sincerely yours,



John Filippelli, Chief
Strategic Planning and Multi-Media Programs Branch

Attachment (Rating Sheet)

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION**Environmental Impact of the Action****LO-Lack of Objections**

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement**Category 1-Adequate**

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analysis, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

AmerGenSM

Michael P. Gallagher, PE
Vice President
License Renewal Projects

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An Exelon Company

10 CFR 50
10 CFR 51
10 CFR 54

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2130-06-20387
August 28, 2006

6/16/06
71FR-34969

Chief, Rules Review and Directives Branch
U. S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

4

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2006 SEP - 6 PM 4: 13

RULES AND DIRECTIVES
BRANCH
105070

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: AmerGen Comments on the Draft Generic Environmental Impact Statement (DEIS) for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station, dated June 2006

The attached are AmerGen Energy Company, LLC's comments on the draft Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 regarding Oyster Creek Nuclear Generating Station.

If you have any questions, please contact Bill Maher at 610.765.5939.

Respectfully,

Executed on 08-28-2006

Michael P. Gallagher
Michael P. Gallagher
Vice President - License Renewal
AmerGen Energy Company, LLC

Enclosure: AmerGen Comments on the Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station

cc: Regional Administrator, USNRC Region I, w/o Enclosure
USNRC Project Manager, NRR - License Renewal, Safety, w/Enclosure
USNRC Project Manager, NRR - License Renewal, Environmental, w/ Enclosure
USNRC Project Manager, NRR - Project Manager, OCGS, w/o Enclosure
USNRC Senior Resident Inspector, OCGS, w/o Enclosure
Bureau of Nuclear Engineering, NJDEP, w/Enclosure
File No. 05040

E-RTDS=ADM-03

SENSE Review Complete
Template=ADM-013

Case=M. Mansfield (MTM2)

AmerGen Comments on the Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station

Page # / Line #	What is in DEIS	What it should be changed to	Why
2-8 / 13 - 14	The low-flow axial pump design allows for some impingement and entrainment survivability.	The low <u>head</u> axial pump design allows for some impingement and entrainment survivability	The dilution pumps are of a high flow design.
2-83 / 18 - 20	Revenues are used by each taxing entity to fund local and county emergency management programs, public safety, local public schools, local government operations, local road maintenance, and the local library system.	Revenues are used by each taxing entity to fund local and county <u>emergency management</u> programs, public safety, local public schools, local government operations, local road maintenance, and the local library system.	Funding for local and county emergency management programs is funded by a levy placed on AmerGen by NJ under the Radiation Protection Act, not through local taxing entities.

II-1

II-2

Appendix A

II-3

AmerGen Comments on the Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station

Page # / Line #	What is in DEIS	What it should be changed to	Why
4-25 / 35 – 37	This line is not considered within the scope of license renewal because it was not constructed for the specific purpose of connecting the station to the grid at the time of initial station licensing.	The Conectiv line should be included within the scope for analysis of impacts for this proposed action.	This line should be included in scope. It is Exelon's understanding that National Environmental Policy Act (NEPA) court cases and Council on Environmental Quality guidelines indicate that scope should include connected actions, which include actions that will not proceed unless other actions are taken [40 CFR 1508.25(a)(ii)]. Operation of the new line is as much connected to Oyster Creek Generating Station operation as operation of the line currently considered in the DEIS.

AmerGen Comments on the Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28 Regarding Oyster Creek Nuclear Generating Station

Page # / Line #	What is in DEIS	What it should be changed to	Why
8-67 / 37 – 39	Consideration of a new nuclear generating plant to replace OCNCS was not included in the AmerGen ER (AmerGen 2005).	Recommend deletion of sentence.	Consideration of Advanced Nuclear Reactor as an alternative to the proposed project was considered in the AmerGen Environmental Report (See Section 7.2.1.4, Other Alternatives). The criterion for further consideration for impacts was the reasonableness of the alternative. In the case of Advanced Nuclear Reactor, it was judged to be extremely unlikely that this particular alternative would be licensed, constructed, and on-line in time for the expiration of the current operating license for Oyster Creek.

II-4

Appendix A

>>> "Edith" <gbur1@comcast.net> 8/30/06 3:30 PM >>>

To Donnie Ashley and Dr Masnik,

Your response to help me in preparing comments.

JJ-1

The following questions regards the radiological impacts from OCNGS gasous and liquid releases harmful to people and marine life.

Part 2 -25-1-7

McLaren/Hart 2000 documents cobalt 60 and Cesium 137 releases in several locatons , -some of which was excavated,

1. Why some, not all removed? Is it possible/
2. Why wasn't it discovered earlier?(Espcially if it was released before 1989)?
Cesium137 has a half life of 35 years and is harmful to the ovaries. Cobalt 60, a half life of 5 years.and is harmful to the liver .
3. Will there be a followup study?
4. Was there or will there be an an NRC investigation of the Bioaccumulation of Cs 137 and Cobalt in marine life in /Barnegat Bay and Oyster Creek as well as our wells?

4. , 4.In this assessment Radionuclides were documented in groundwater and soil sediments.What is considered background levels?

SEIS Part 2, 33, lines 1-12

JJ-2

OCNGS claims to have stopped releasing radionuclides and low leevel isotopes and radioactive waste dischargesduring the 80's.

The DEP found no compliance issues or toxicity.

However, McLaren/Hart 2000 documents Cs 137 and Cobalt 60 releases.'

Edith Gbur, Jersey Shore Nuclear Watch

From: Edith [gbur1@comcast.net]
 Sent: Tuesday, September 12, 2006 7:09 PM
 To: D. Ashley; Michael Masnik; OysterCreekEIS@nrc.gov; Bo Pham
 Subject: Re: More Questons regarding the EIS

Thank you . Yes, i do wish more information, as follows:

1. Can you refer me to data and specific informantion

KK-1

2. You said that " the amount of radioactive material released to the environment during normal operations is precisely known."

What levels of radionuclides are considered background as opposed to elevated levels ? - Can it be answered in millicuries and rads instead of rem ? This applies to Sr 90, Cs 137 and OysterCreek has emitted the greatest amount of airborne radioactivity, of any reactor in the US. The amount is about 77 curies of iodine 131 and iodine and particulates with a half life of 8 days or more. However you testified that OCNCS radiological emissions were a tenth of the amount allowed or .026 milirams.

How do the two data compare? What about the conclusions?

Is it possible that short lasting isotopes are not counted? Do you believe that because an isotope decays rapidly it vanishes harmlessly ? Do you know what short lived isotopes become transformed into different radioactive elements as they decay?

What does the NRC consider a safe level ? Do you disagree with the National Academy of Sciences June 2005 BEIR VII report that concludes all doses of radiation are harmful?

If it is calculated that 12 deaths would occur among residents or workers from emissions is it worth the risk?

3. Cs 137 and cobalt 50 were found in estuary near Little Egg Harbor, What were the levels? Were other radionuclides found?"

KK-2

4. The SEIS (Part 2, 33 said during the 80's "OCNCS ended the operational releases liquid radioactive waste discharges and low level radioactive into Barnegat Bay and Oyster Creek ." Wasn't there concern about the accumulation of 20 years of radioactive discharges to Barnegat Bay and Oyster Creek.

KK-3

5. You stated that "concentrations are decreasing over time due to radioactive decay" as a reason for not removing all of the isotopes.

KK-4

However , Were tests taken for long lived fission products including plutonium 239, (half life of 24,000 years), radium 226 (half life of 1,600 years) uranium 233 (half life 162,000 years, -

Appendix A

- KK-5 | 6. You stated that some of the contaminated areas and soil was not removed because The McLaren/Hart report states that radionuclide activity in the soils at the Oyster Creek Plant are not impacting the offsite concentrations are decreasing over time due to radioactive decay - environment.. Where is your proof ?
- KK-6 | 7. What scientific proof do you have that " Wells with elevated levels of radioactive contamination in the Toms River area have been shown to be the result of naturally occurring radioisotopes." What natural isotopes?
- KK-7 | 8. Clean Ocean Action testified that that there is an increase of contamination in the soils and documented and was ignored., Would it make any difference in your assessment
- KK-8 | 8. Why does the NRC depend OCNGS for self monitoring when concerned taxpayers disagree because it is akin to asking the wolf to guard the chicken c oop? The public and experts have questioned the monitoring and sampling programs and being self serving and/or unscientific. Why not involve the National Academy of Sciences in the SEIS when it has the confidence of the US Congress was requested by elected officials'

From: Bill Hering [mailto:bill.hering@smelectric.com]
Sent: Tuesday, July 11, 2006 12:08 PM
To: 'OysterCreekEIS@nrc.gov'
Cc: 'laceyclerk@comcast.net'
Subject: License Renewal

Gentlemen, I would like to submit my comments to you regarding the re-licensing process for Oyster Creek Nuclear Station in Lacey Township, NJ.

I am a property owner and resident of Lacey Township, NJ for many years. I whole heartedly support the relicensing of this facility. I have had extensive involvement in the Security UpGrade through the Electrical Contractor during 2004. The employees and the management staff are committed to safety as I could see as an outside professional in Occupational Safety and Health, during that 15 week operation to enhance security at Oyster Creek, under Home Land Security operations. I also was involed in that same capacity at Salem Hope Creek during 2005. The plant is a safe facility.

LL-1

LL-2

Those FEW who oppose the relicensing have not shown anyone any valid concerns other than false fear tactics. The plant is 40 years old come 2009, but that doesn't mean we can't have it safe with constant up grading. If the containment vessle is sound which is your job at NRC to ascertain, then the plant should remain "ON LINE". It's puzzling to me and many of my friends and Neighbors that these groups opposing the license renewal seem to get a loud voice in the press and at various meetings, but really, who do they really represent but a very small minority of our population in Ocen County and the region.

LL-3

I ran my own survey these last few months speaking to many around the region, and when I asked: do you know of the Mothers, Grandmothers, Nuclear Opponents, etc etc... NOT ONE PERSON IN AS MANY AS 60 OR SO, SAID THEY REPRESENT THEM IN ANY WAY OR EVEN KNEW OF THESE FOLKS.

Let's do what's right for the people overall and think positive about Nuclear Power. The President himself has taken a position to expand Nuclear Generation of Power.

LL-4

Jon Corzine also was reported in the press, to have some concern of the plants age, but said that's not a reason to shut it down.

In closing, you are charged with the decision of renewal for a 20 year period by statue. Just perhaps in the ensuing years more compact, modern design Nuclear Reactors, which are being worked on as we speak here today, maybe the new transition for plants as Oyster Creek as they can shift over to new reactor technology much sooner than 20 years and the industry itself will upgrade prior to the expiration of the licensing period. Electric Power is precious to us all ! We need every Megawatt we can generate safely, without sending CO 2 into the atmoshere!

LL-5

My best to you all, I have faith in you, good luck and God Speed !

William E. Hering
1005 Peaksail Point
Lanoka Harbor, NJ 08734

609 971 0930
732 713 2839

RUTGERS ENVIRONMENTAL LAW CLINIC

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Rutgers, The State University of New Jersey
School of Law - Newark
Fax: (973) 353-5537

September 8, 2006

VIA EMAIL AND U.S. MAIL

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, D.C. 20555-0001
Oyster CreekEIS@nrc.gov

Subject: NUREG-1437: Generic Environmental Impact Statement for License
Renewal of Nuclear Plants, Supplement 28, Regarding Oyster Creek
Nuclear Generating Station Draft Report for Comment

Please accept these written comments of Nuclear Information and Resource Service, Jersey Shore Nuclear Watch, Inc., Grandmothers, Mothers and More for Energy Safety, New Jersey Public Interest Research Group, Environment New Jersey, New Jersey Sierra Club, New Jersey Environmental Federation, and Save Barnegat Bay (the "Coalition") on the above-referenced Draft Environmental Impact Statement ("DEIS") for Oyster Creek Nuclear Generating Station in Forked River, NJ ("Facility"). Many of the afore-mentioned groups have submitted a separate comment letter specifically with respect to safety and security issues. NRC should consider and respond to both sets of comments, as they are complementary and not duplicative.

The operation of Oyster Creek Nuclear Generating Station near the shores of Barnegat Bay is a matter of great public concern. The Bay is a public resource that is valued by the community for its wildlife, aesthetic values, and for fishing, boating and other recreational activities. Millions of dollars in public resources have been devoted to restoring the ecological health of the Bay. In 1987, Congress recognized the vital importance of estuaries and amended the Clean Water Act to create the National Estuary Program ("Program"). Clean Water Act § 320, 33 U.S.C. § 1330. In 1995, the Administrator of the Environmental Protection Agency accepted Barnegat Bay into the Program. Today, Barnegat Bay is one of 28 estuaries of "national significance."

In addition to its location near the Bay, the Facility is situated within the Pinelands Preservation Area. It is classified as a United States Biosphere Reserve and in 1978 it was established by Congress as the country's first National Reserve. This internationally important ecological region is 1.1 million acres in size and occupies 22% of New Jersey's land area. It is the largest body of open space on the Mid-Atlantic seaboard between Richmond, Virginia and Boston, Massachusetts and is underlain by aquifers containing 17 trillion gallons of some of the

Carter H. Strickland, Jr., Esq.+ Julia L. Huff, Esq.*+ Kathleen J. Shrekgast, Esq.# Richard Webster, Esq.+
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* Admitted in New Jersey Pursuant to 1:21-3(c) + Also admitted in New York # Also admitted in Pennsylvania

MM-1

purest water in the land. These aquifers provide virtually all of the drinking water for the residents of southern New Jersey.

MM-1
(contd)

From the time construction began in the mid-1960s, when the local ecosystem was destroyed to make way for the Facility and its intake and discharge canals, to the present day, the Facility has had a significant, adverse affect on the environment. Because the DEIS fails to properly assess baseline conditions prior to construction of the Facility, the No Action Alternative is inadequately portrayed and analyzed. If the adverse impacts caused by the Facility were properly analyzed, and then compared to a proper assessment of the No Action Alternative, there would be no way to avoid the conclusion that operating the Facility harms, and will continue to harm, the environment. The statement of the purpose and need for the proposed action reveals much about the NRC's attitude toward the Facility. The purpose of the action is to maintain the status quo, regardless of the costs or the consequences. This flies in the face of the purposes and goals of the National Environmental Policy Act ("NEPA"). The DEIS disregards the many known adverse affects and essentially parrots the information provided to the NRC by the applicant. As a result, the NRC has failed to take the requisite hard look at the proposed action. In addition, the DEIS perpetuates inaccuracies presented by the applicant with respect to the impact on the aquatic environment, going so far as to misrepresent the conclusions of studies cited. Not only does NRC misrepresent the studies cited, it fails to acknowledge the fact that the studies cited do not support the conclusion reached by the agency that the proposed action would have only a small impact on the environment. NRC also incorrectly analyzes the applicability of the EPA's Phase II rules regarding cooling water intake structures. Finally, NRC unreasonably relies on the incorrect analysis forwarded by the New Jersey DEP in the draft NJPDES permit and incorporates those preliminary conclusions, conclusions that have been heavily criticized and not finalized, into the DEIS. For all of these reasons, as well as a host of specific comments and questions raised in this letter, NRC should not and cannot make any conclusions about either the environmental impact associated with the proposed relicensing of the Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA.

MM-2

MM-3

MM-4

MM-5

MM-6

The Purpose and Need Section Defines the Purpose and Need of the Proposed Action Exclusively From Oyster Creek's Perspective, Foreclosing an Analysis of a Reasonable Range of Alternatives

NRC defines the purpose and need of the proposed action as merely providing an option of keeping a nuclear power plant online. DEIS at 1-8. NRC's decision to define the purpose and need for the project exclusively from Oyster Creek's perspective, making renewal of the license a foregone conclusion, is contrary to NEPA regulations and thirty-five years of NEPA jurisprudence.

MM-7

Because the stated purpose and need of a federal action determines the range and analysis of alternatives, NRC's failure to properly define the purpose and need makes proper consideration of alternatives impossible. See City of New York v. Dep't of Transportation, 715 F.2d 732, 743 (2nd Cir. 1983) (it is arbitrary for an agency "to narrow the objective of its action artificially and thereby circumvent the requirement that relevant alternatives be considered."); see also, Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991) ("an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality.").

NRC defined the purpose and need exclusively from Oyster Creek's perspective, as simply issuing a renewal of an operating license. NRC appears to be equating Oyster Creek's corporate goals with its own objectives. While the goals of a private party applicant are, to a limited extent, relevant in determining a project's purpose and need, "[m]ore importantly, an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other Congressional directives." Citizens Against Burlington, 938 F.2d at 196.

Coupled with NEPA's mandate to act as stewards for present and future generation, see 42 U.S.C. § 4331(a) (2005), it is impossible for NRC to equate its statutory objectives with Oyster Creek's goal of maximizing profits on behalf of its shareholders. NRC cannot fulfill its NEPA obligations by simply looking to what is most convenient and profitable for Oyster Creek. See Van Abbema v. Fornell, 807 F.2d 633, 638 (7th Cir. 1986) ("the evaluation of 'alternatives' mandated by NEPA is to be an evaluation of alternative means to accomplish the general goal of an action; it is not an evaluation of the alternative means by which a particular applicant can reach his goals."). NRC's narrowly defined purpose and need is arbitrary, capricious, an abuse of discretion and otherwise not in accordance with law, as it precludes any analysis of a reasonable range of alternatives impermissibly rendering the result in this case a "foreordained formality."

One of the purposes of NEPA was to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. The DEIS does nothing to forward those goals, as it suggests in the statement of purpose and need that the goal is to keep the Facility as an option for the State of New Jersey. There is no effort to prevent or eliminate damage to the environment. Further, the DEIS, which is riddled with flawed data, misrepresentations and bereft of any comprehensive information about the ecosystem directly impacted by the Facility, also fails to promote another of the goals of NEPA, namely to enrich the understanding of the ecological systems and natural resources important to the Nation." Id.

The DEIS Is Riddled with Inaccuracies and Misrepresentations

Another fundamental flaw of the DEIS is that the NRC appears to have simply regurgitated information supplied to it by the applicant and never confirms the veracity of the information. As a result, misrepresentations and inaccuracies have been interwoven and form the backbone of NRC's conclusions in the DEIS.

First, the impingement and entrainment losses documented over the years by AmerGen are virtually meaningless in the absence of Bay population surveys and associated population databases collected over the past 30 years against which the Facility-based losses can be compared. Without that basis for comparison, both NRC and AmerGen are unable to arrive at any conclusions about the affect the Facility is having on the environment. Nowhere is this made more apparent than is section 2.2.5.3 of the DEIS. For virtually all of the species selected by NRC to discussion, the DEIS states that there are no population abundance data or trends. Professor Michael Kennish also points out this flaw in the DEIS in his testimony on July 12, 2006. Without this information, NRC and the Facility cannot determine the true impact of the Facility on aquatic communities in the bay. The only defensible assessment of the Facility's affect on Bay populations took place in the late 1970s, when the last population samples were collected in the Bay concurrently with impingement and entrainment samples. This assessment was made as part of the Facility's required Clean Water Act Section 316 Demonstration, and itself has flaws that are documented in the attached comment letter, which letter is incorporated herein and is to be made part of the record. In the case of the DEIS, not only has NRC relied on old and incomplete data, it completely fails to take into account the tremendous natural variation in the abundance of aquatic organisms in the Bay, as well as the natural variation in those organisms impinged and entrained by the Facility. Professor Kennish has noted that this natural variation can exceed 200-300% annually. See Kennish July 12, 2006 Testimony at 72:1-5. To rectify the information deficit, and thereby allowing any regulator to arrive at defensible conclusions as to the impact the Facility is having on the environment, population surveys in the Bay should be conducted annually, or at least every five years, together with impingement and entrainment sampling. Id. In the absence of this information, the assessment of the cooling water intake system affects on the environment, as described in Section 4.1 of the DEIS are simply inaccurate. Therefore, NRC's conclusions in the DEIS regarding the Facility's impacts on aquatic communities in Barnegat Bay are invalid.

In addition to this fundamental flaw, there are several, particular statements and conclusions by NRC that are questionable, at best. In each case, NRC is attempting to minimize the affects of entrainment and impingement of aquatic organisms. For example, in Section 4.1.1 (page 4-15), NRC states: "There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource." However, for the reasons articulated in the preceding paragraph regarding the absence of Bay population surveys, this statement is unfounded and incorrect. This statement is particularly problematic in the NRC is purported to extrapolate from the current situation and make conclusions about what is likely to happen in the future. NRC cannot point to any data or studies cited in the DEIS that support this statement.

Appendix A

MM-9
(contd)

Not only can NRC not point to any data that supports those conclusions, the data we do have for at least two of the Representative Important Species identified in the Section 316 Demonstration, the hard clam (*Mercenaria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*), evidences a dramatic decline in those populations in the Bay. In another example, NRC comes to the same faulty conclusion on page 4-21 of the DEIS: "There is no evidence to suggest that past, current, or future impingement of these species would destabilize or noticeably alter any important attribute of the resource." Thus, NRC's cannot support its conclusions in the DEIS with respect to the impingement and entrainment effects of the Facility without data from Bay surveys conducted during the past three decades.

In what could possibly be described as NRC's failure to rigorously review the information provided to it by the applicant, NRC misrepresents a statement made by Professor Kennish in one of his published articles on the Barnegat Bay-Little Egg Harbor Estuary. Professor Kennish's work is misrepresented three times in the DEIS—and it is done in such a way so as to support NRC's conclusion that the Facility is not having a significant impact on aquatic populations in Barnegat Bay. The error occurs on pages 4-15, 4-21, and 4-51 and includes statements taken directly from Kennish, M. J. 2001. State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*, Special Issue 32, pp. 243-273. As Professor Kennish pointed out in his July 16, 2006 testimony, the cited work is a review of earlier studies conducted on Bay populations. Professor Kennish's conclusions as to the affect the Facility is having on the Bay are valid only with respect to the two-year period from 1975-1977. These conclusions are not valid as to the entire operating period of the Facility and cannot be cited for that proposition.

In what appears to be yet another example of an incomplete review by NRC staff of the information provided by the applicant, NRC suggests in the DEIS that there are a number of studies reviewed by NRC that do not contradict NRC's findings with respect to the affect of the Facility on the aquatic populations in the Bay. First, it is irrelevant whether recent studies do not contradict NRC's findings—as the lack of a contradiction should not be construed in any way as support. Second, and more troubling, is that few studies have been published recently (the past 20-30 years) in peer-reviewed journals that deal with the Facility's impact on aquatic. NRC fails to cite to these studies, and thus the public is unable to discern whether NRC even reviewed those studies, let alone comment meaningfully on the NRC's conclusions.

MM-10

A troubling trend with respect to the Facility has been to ignore the negative impacts the Facility has on the Bay and the area immediately surrounding the Facility, and focus on restoring other areas. This concept was *proposed* by the NJDEP in the draft NJPDES permit, and NRC (as well as AmerGen) has gravitated to this option because it essentially allows AmerGen to continue to operate with impunity and externalize what should arguably be internalized by the Facility. Not only is this option problematic from the standpoint that it allows AmerGen to maintain the status quo, it suggests that regulators are reading out of the Clean Water Act the requirement that facility's using cooling water intake structures reduce impingement and entrainment impacts by implementing performance standards. In fact, EPA's efforts to downplay this requirement in the Phase I rules (with respect to new facilities) and allow for

restoration in lieu of operational changes was challenged in court and that provision was ruled to be in violation of the Clean Water Act. A similar challenge was brought against an identical provision in the Phase II rules, and the Second Circuit is likely to find that the provision of the Phase II rules also violates the CWA.

MM-10
(contd)

In the case of the DEIS, NRC has considered as one of the alternatives that the Facility would continue to operate using its antiquated once through cooling water intake system, "modified" by restoration efforts. DEIS Section 8.1.2. This approach is not only misguided for the reasons stated in the preceding paragraph (and more fully explained in the attached NJPDES comment letter and letter to the NJDEP), but also because it is based on a flawed or incomplete understanding of the Bay. First, for the reasons set out earlier in this comment letter, the status of Bay populations is unknown. Until that information is obtained, there can be no way to know what type of remedial or restorative measures should be undertaken to offset impingement and entrainment losses, assuming for purposes of argument that such an effect can be achieved in the first instance.

Second, the DEIS essentially assumes that coastal wetlands should be restored in an effort to offset the impingement and entrainment losses, but that assumption appears to be based on generalized information about the loss of coastal wetlands, and not connected in any way to actually restoring habitat that fosters the types of species adversely affected by the Facility. On page 2-31 of the DEIS, NRC cites to a study by Hartig and Gornitz in support of its conclusions about the loss of coastal wetlands. This study relates to Jamaica Bay, which is a completely different system. It is inappropriate to use this study to extrapolate both positive and negative benefits associated with restoration.

The general loss of salt marsh along the eastern seaboard is due to sea level rise exceeding the rate of sediment and organic matter accumulation or accretion on the salt marsh surface. The sea level rise is most likely related to global warming trends. This is a problem that poses a long-term threat to most salt marsh systems. Some systems are maintaining their position, however, because of rapid accretion. The loss of salt marsh in the Barnegat Bay-Little Egg Harbor system appears to be relatively minimal over the past 30 years since the federal government, and later the State government, began protecting wetlands.

Contrary to the suggestion in Section 2 of the DEIS, every bay and its associated wetlands areas are different. It is inappropriate to compare Jamaica Bay to the Barnegat Bay-Little Egg Harbor system. Development and other human activities around Jamaica Bay have been dramatic, even relatively recently, which is an important point of differentiation between the two systems. Some bays are surrounded by submerging shorelines related to excess removal of groundwater or oil and gas (for example Galveston Bay in Texas), while others are emerging due to isostatic rebound over the past 10,000 years in response to melting of continental glaciers from the last major glacial period (bays and shorelines in the northeastern part of the country).

The other study cited in Section 2.2.5.1., by the Global Land Cover Facility, does not demonstrate that the wetlands in Barnegat Bay are being impacted in the manner suggested by

MM-11

MM-11
(contd)

the DEIS. Instead, a better source of information is Lathrop, R. G. and J. A. Bognar. 2001, *Habitat loss and alteration in the Barnegat Bay region*, in M. J. Kennish (editor), *Barnegat Bay-Little Egg Harbor, New Jersey: Estuary and watershed assessment*. Special Issue 32, *Journal of Coastal Research*, pp. 212-228. The Barnegat Bay system lost about 4,190 hectares (~27%) of its salt marsh habitat over the century period from 1870 to 1970 primarily due to development, but also due in part to mosquito ditching. Since 1970, however, the loss has been minimal with estimates of about a 1-1.5% additional loss over the past three decades. The Wetlands Act has been critical to this stabilization. The current loss of salt marsh is very small in the system, and in fact there are some areas, most notably in the vicinity of Barnegat Inlet, where the salt marsh area has actually increased according to the authors. In conclusion, they state the following (p. 224): "The Wetlands Act of 1970 appears to have been largely successful in halting the high rate of loss of tidal salt marsh habitats due to human development." Lathrop, R. G. and J. A. Bognar. 2001, *Habitat loss and alteration in the Barnegat Bay region*, in M. J. Kennish (editor), *Barnegat Bay-Little Egg Harbor, New Jersey: Estuary and watershed assessment*. Special Issue 32, *Journal of Coastal Research*, pp. 212-228 at 224. By way of comparison, other nearby states in the Mid-Atlantic region (e.g., Delaware) show the same steep decline in salt marsh habitat prior to the Wetlands Act and then more recent stabilization since 1970. The fact that the tidal marshes along the Barnegat Bay-Little Egg Harbor Estuary appear to be stable, however, in no way suggests that there hasn't been any loss, or that restoring these areas would not benefit the Bay. Kennish, M. J. 2001. Coastal salt marsh systems: a review of anthropogenic impacts. *Journal of Coastal Research* 17: 731-748. While the members of the Coalition firmly believe that we must vigilantly protect our salt marshes, allowing the Facility to "mitigate" its harmful effects on the environment by essentially writing a check and restoring other land does not address all of the problems caused by the Facility and does not satisfy the requirements of the CWA.

MM-12

In the case of the Facility, the emphasis should be on aquatic habitats and communities right in the Bay itself for remediation. *This has not been done in the DEIS, and cannot be done*, because there is a dearth of information to even allow an effective restoration program to be developed. Until the necessary information exists to design the restoration rationally and then assess the impacts of this "alternative," it cannot be properly analyzed and considered as such.

MM-13

In addition to the lack of information about the Bay populations, a review of the DEIS makes it clear that there is no thorough, pre-construction baseline from which to determine the impacts of the Facility. The 1974 Final Environmental Statement was completed after the Facility had been operating for 5 years, and as such cannot be used as a baseline. Data collected in the late 1960s would have been affected by the construction of the Facility which had already begun, and would also be skewed. Finally, this document is not readily available to the public and appears to be only available by making a Freedom of Information Act request.

Specific Comments and Questions on the DEIS

In addition to the broader concerns discussed above, our review of the DEIS also gives rise to the following specific comments and questions:

2.1.3 Cooling-and Auxiliary-Water Systems

MM-14

- This section of the DEIS appears to be based in large measure on the draft NJPDES permit issued for comment by the NJDEP. As such, NRC should consider the attached comments to the draft permit. It appears NRC used the draft permit as the basis for determining the scope of alternatives to be considered the DEIS.

2.1.4.1. Liquid Waste Processing Systems and Effluent Controls

MM-15

- The DEIS states that the Facility has not *routinely* released liquid wastes since 1980s. (2-10). However, the release of these wastes is still potentially part of operations and should be considered in the course of ascertaining impacts to the environment.
- Because tritium was released in 2000 (2-11), NRC cannot assume that plant operates without releases of this nature as a possibility. Did NRC factor future releases into its analysis?
- Does NRC take the position that simply because gaseous releases are covered by a permit, that there is no impact? (2-12)
- Does NRC take the position that simply because the use of herbicides to maintain the transmission lines is permitted, that there is no impact? (2-16) Did NRC consider the ongoing impact of the use of these poisons on the water, plant and wildlife on or near the Facility?

MM-16

MM-17

MM-18

2.2.1. Land Use

MM-19

- The DEIS references (2-18) the CZMA inconsistency determination reached by NJDEP on August 19, 2005 and states that the determination was made based on a lack of information. The CZMA determination did point out the places in which no determination could be made because of a lack of information, but the NJDEP also made separate findings of inconsistency and highlighted several major issues. Specifically, the NJDEP found that the applicant was not in compliance with Basic Coastal Policy 5 and the Public Access to Waterfront Rule. August 19, 2005 CZMA Determination at 10.

2.2.2 Water Use

MM-20

- Why is the creation of the 1963 dam created for fire water storage not factored into the 1974 FES? Based on references in the DEIS, it is only discussed in a NJDEP 2005a report. (2-19)
- Why did NRC stop its review of water quantity issues at 2000? (2-20) Paper records are available from the NJDEP prior to 2000 and should be reviewed for purposes of determining impacts.

MM-21

Appendix A

2.2.3. Water Quality

MM-22

- The existence of a permit does not mean there is no impact to the environment. The benefit of NEPA is that it allows a decision maker to review cumulative impacts, whereas individual, departmental regulators often do not have the ability to make those cumulative impact determinations. In addition, the Facility does not have a perfect compliance record, which should affect the discussion of impacts. Indeed, the NJDEP fined the Facility \$35,000 for violating its permit and causing a fish kill in January 2006. Moreover, the January 2006 incident was not the first instance of fish kills caused by the Facility.

MM-23

- With respect to water quality, NRC did not appear (2-21) to review data prior to 2000. What is the justification for this?

MM-24

- There are more than 100 areas of concern (2-22) at the Facility. Where does NRC consider the past impacts that led to contamination at over 100 places at the Facility with respect to whether an additional 20 years of operation will have an impact on the environment?

MM-25

- The DEIS reveals that the confined aquifer containment was breached when the reactor was constructed. A 1986 tank spill led to contamination of the aquifer. Groundwater is primary source of drinking water in this area of NJ. Where does NRC consider future impacts to groundwater, in the face of growing water shortages and increased water demand, based on past harm?

2.2.5.3. Important Fish and Shellfish near OCNCS

MM-26

- The studies referenced in this section are limited to 3 year period, and were conducted post-operation of the Facility and nearly 10 years after construction began. In addition, there were collected from western Barnegat Bay and do not represent a full Barnegat Bay study.

MM-27

- There are no recent population trends for bay anchovy. (2-36). How can NRC make conclusions about the impact of the Facility in the absence of this information?

MM-28

- With respect to the American eel (2-36), it is a catadromous species. The current abundance of American eel is unknown. The dam may be restricting upstream migration. This species was not evaluated in the 316(b) study. The fishery appears to be in decline, and FWS is engaged in a status review. FWS has already determined that a listing may be warranted, and the 12 month finding required under the ESA is due. What consideration does NRC give to the impacts another 20 years of operation will have on this species?

MM-29

- There are no recent population trends for four-spined stickleback (2-37). How can NRC make conclusions about the impact of the Facility in the absence of this information?

MM-30

- There are no recent population trends for menhaden – only catch information. Indeed, the catch is down. (2-38). How can NRC make conclusions about the impact of the Facility in the absence of this information?

- There are no recent population trends for weakfish, and the population appears to be overfished. (2-39). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-31
 - There are no recent population trends for spot; the condition of the stock is unknown. (2-39) How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-32
 - There are no recent population trends for Atlantic silverside. (2-40). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-33
 - The size of the striped bass population in the Bay is unknown. (2-41). Because of the stock's decline, resource management actions were necessary. How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-34
 - There are no recent population trends for bluefish – only landing data. The stock had to be rebuilt. (2-42). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-35
 - There are no recent population trends for winter flounder, but there is a FMP for the species. It is considered overfished and EFH has been determined. (2-43). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-36
 - There are no recent population trends for northern pipefish. (2-44). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-37
 - Commercial landing data is available for blue crab (2-44), but this not the same as overall population levels or abundance. Just because there are recreational crabbers, that does not mean that the population can sustain both fisheries. NRC's conclusion with regard to what the population can withstand is unfounded. How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-38
 - There are no population estimates available for shrimp. (2-45). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-39
 - It is unclear if there are recent population trends for hard clams. The harvest has dramatically declined. (2-45). How can NRC make conclusions about the impact of the Facility in the absence of this information? MM-40
- 2.2.5.4 Other Important Aquatic Resources Near OCNCS
- The DEIS reports that benthic infauna declined from 1969-1973 (2-48). The DEIS says that it is not possible to determine whether the Facility is a contributor to the decline, but does not cite any authority for this conclusion. What is NRC's authority for this conclusion? Localized impacts have been documented. Mobile epifauna inhabit the Bay, but the current abundance has not been estimated with any precision. (2-49) MM-41
 - No recent investigations of zooplankton abundance have been conducted. They were only done in 1975-77. (2-49) How can NRC make any conclusions about impact to the environment without this data? MM-42

2.2.5.5 Threatened or Endangered Aquatic Species

MM-43

- Loggerheads (2-51) population estimated at 44,780. The DEIS cites CCC 2005. CCC 2005 states that the population estimate is 44,560 nesting females, and includes the following caveat: "Please understand that world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.cccturtle.org/loggerhead.htm> accessed August 31, 2006. Does NRC factor the uncertainty into its conclusions about the populations?

MM-44

- Kemp's Ridley sea turtle are the world's most endangered sea turtle (2-51). No population numbers exist. However, even while NMFS was concluding its consultation with NRC in 2005, two additional Kemp's Ridentles were at the Facility in July 2005. Why is this information not presented? NRC reinitiated consultation with NMFS in June 2006, but that is not reflected here. Has NRC failed to consider that the Facility continues to take endangered sea turtles?

MM-45

- With respect to Leatherbacks (2-52), the DEIS cites Pritchard data from 1983 and estimates females at 100,000. This data is over 20 years old. The CCC number is not supported with any data, and contains caveat that "world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.cccturtle.org/leatherback.htm> accessed August 31, 2006. How can NRC make any conclusions about Leatherbacks without this information?

MM-46

- With respect to Green sea turtles (2-53), the CCC numbers cited also have the same caveat: "Please understand that world wide population numbers for sea turtle species do not exist and that these are estimates of the number of nesting females based on nesting beach monitoring reports and publications." <http://www.cccturtle.org/green.htm> accessed August 31, 2006. Again, how can NRC arrive at conclusions about the impacts under these circumstances?

2.2.6.2 Threatened or Endangered Terrestrial Species

MM-47

- The list of threatened and endangered species appears only to relate to federal species, with mention made of corresponding state listing status. Why are state listed species not considered (2-59)?

MM-48

- The DEIS notes that (2-57) waterfowl congregate around open water created by thermal discharge plume. Is this a good thing? How does this change or affect migratory patterns? Is this not an impact?

MM-49

- With respect to bog asphodel (2-69), the DEIS says it is not likely to occur on the site. But it occurs within 1.3 miles of the site. NRC fails to articulate how the habitat 1.3 miles away from a 800 acre site can be so different that the species is not present on the site. The same comment applies to swamp pink (2-68), Knieskern's Beaked-Rush (2-60), and chaffseed (2-70).

- The site is suitable for bog turtle (2-71). Were impacts to this species considered? If so, what was NRC's conclusion?

MM-50

2.2.7. Radiological Impacts

- Why does NRC only consider the monitoring results from 2000-2004 (2-74)? In light of the fact that there have been past releases by the Facility, how can NRC justify reviewing only 4 years of data from a facility that has been in operation for 40 years for purposes of determining whether another 20 years is warranted? In addition to pre-2000 data, post-2004 data should also have been considered.
- With respect to Cesium-137, its presence is attributed to historical releases, and it has been consistently detected. In addition, it has been observed in the teeth of children who live close to the plant. Isn't it likely that it will continue to be detected? Isn't it possible that during the license renewal period, other releases could occur? Why is that possibility not considered?

MM-51

MM-52

2.2.8 Socioeconomic

- How can NRC draw any conclusions with respect to archaeological resources when no study was completed prior to construction? The DEIS suggests that there is some dispute as to the presence of historic resources on the site.

MM-53

4.1 Cooling System

- Why is there no discussion of the conflicts associated with the Facility's use of Forked River and Oyster Creek and other uses by the public or by wildlife?
- With respect to entrainment information, the DEIS fails to note or acknowledge that the status of populations in Barnegat Bay is unknown, and thus, it is impossible to make conclusions about the impact the once through cooling system is having on the Bay. Professor Michael Kennish's testimony at the July 12, 2006 public hearing highlights this problem, and it is discussed thoroughly elsewhere in this comment letter.

MM-54

MM-55

4.1.1 Entrainment

- On page 4-10 (lines 35-39) what articles support this conclusion? The DEIS fails to cite any support for this conclusion.
- On line 31 at page 4-11, there is a discussion about mitigation, but the assumptions about the Phase II rules is incorrect. NRC should review the attached comments on the draft NDPES permit and the attached letter to Commissioner Jackson on this point, both of which are incorporated herein and are to be considered part of the record.
- On page 4-12 at line 27, the DEIS cites estimates based on 1975-76 numbers, but populations fluctuate (see testimony of Michael Kennish, Ph.D.). The entrainment was measured at the discharge canal, but there were no corresponding studies in the Bay.

MM-56

MM-57

MM-58

Appendix A

MM-58
(contd)

This problem, coupled with the possible underestimation in the original study (4-12, line 27), calls into question this conclusion.

- On page 4-14, NRC only evaluated the conclusions drawn by others, but did not do any independent assessment; therefore, all of the flaws in the original data or those studies have become part of the DEIS.
- The DEIS states that there are no obvious changes in communities in the Bay, but the data collection stopped in 1981. How can NRC justify or support this conclusion?
- The DEIS references the fact that the applicant has recently resumed intake sampling again in 2005. However, this is not adequate for concluding that the impact is small and is meaningless without comprehensive data about the populations in the Bay.
- On page 4-15 (lines 34-38), the NRC misrepresents Michael Kennish's conclusions.

4.1.2 Fish/shellfish entrainment

MM-59

- Which articles support these conclusions? The DEIS fails to cite any authority.
- NRC fails to discuss how the problems with impingement number estimates affect its conclusions as to impacts.
- Professor Kennish is misrepresented on page 4-21 (lines 36-38)

4.1.3 Heat Shock

MM-60

- See comments to NJPDES draft permit for a thorough critique of the thermal discharge from the Facility.

4.4 Socioeconomic Impacts

MM-61

- NRC concludes that there are no impacts since the 1996 GEIS was prepared (4-32). How can this be, when the GEIS referred to is 10 years old? Ocean County has had significant population growth and increased traffic. Have there been any changes to the evacuation plan? Did NRC consider expected population growth during the relicensing period and how that growth impacts already stale findings from 1996 regarding evacuation and other impacts?

4.6 Threatened or Endangered Species

MM-62

- On page 4-44, NRC essentially concludes that the impacts to species are small, because FWS concluded that the project would not adversely affect federally listed species. Is NRC confusing the jeopardy standard under Section 7 of the ESA with the requirements of NEPA? We know the Facility is adversely affecting species, because it is killing and injuring some of the world's most endangered sea turtles.

- In section 4.6.2, NRC makes a conclusion that terrestrial species impact is small. However, FWS recommended a survey. Why was this survey not completed before the DEIS was prepared and NRC reached its conclusions about impacts?

MM-63

4.7 Evaluation of New and Potentially Significant Information

- On page 4-48, there is a discussion about the fire dam and its impact on shad. NRC does not discuss the possibility that shad are not using the creek because the creek was essentially destroyed in 1965 when the Facility began construction. There were no studies done prior to this to establish the baseline, so NRC and the applicant cannot conclude that there is no impact. The pond for firefighting will continue to exist because of the dam. If the license is not renewed, the dam could be removed and the pond water returned to the creek; therefore, the pond is affected by the decision to renew the license and should be considered. Indeed, the no-action alternative should review the positive environmental impacts of dam removal.
- How can NRC conclude that there are only minor effects in Barnegat Bay (4-48) when the DEIS, and all of the data submitted by the applicant to NRC is riddled with errors, flaws, and the significant omissions highlighted earlier in this comment letter? *There are no baseline studies and no population numbers;* therefore, NRC cannot reach this conclusion.

MM-64

MM-65

4.8. Cumulative Impacts

- *There have been no continuous studies to monitor the Bay populations. These studies could and should have been done. Updates performed now cannot be the basis for a determination that there are no cumulative impacts. The ecosystem was destroyed. NRC is unable to substantiate the conclusion that the impacts are localized (4-50). There is no question that the amount of freshwater that reaches the Bay has changed and will continue to be affected as long as the license is in place. The volume of freshwater that enters this system is critical, in light of the fact that this is a system that does not flush frequently.*
- While there may be insufficient evidence to definitively prove that the operation of the Facility's cooling system is altering the ecosystem, there is no evidence whatsoever to suggest that the Facility's archaic once through cooling system is not having a large impact on the ecosystem. Taken at face value – the volume of water used, the impingement and entrainment data, the increasing takes of sea turtles, and the crash of fish stocks, the Facility is having an impact. NRC cannot arrive at any conclusions without data about the Bay populations.
- With respect to comments on the RIS (4-52), please see the attached NJPDES comment letter
- There is no evidence to suggest that anyone knows what the population abundances are for turtles, so one cannot assume that the ITS mitigates any and

MM-66

MM-67

MM-68

Appendix A

MM-68
(contd)

all impacts. (4-53) The fact of the matter is that this Facility kills turtles, and those turtles are either threatened or endangered species.

MM-69

- There is no discussion of the affects on state listed species. (4-53). The NRC should explain how it comes to the conclusion that with respect to threatened or endangered plants, there can be species found within one mile of the site, but yet the site is not suitable for those species. NRC or the applicant must explain how the 800 site differs from the habitat one mile from the site upon which threatened or endangered species are found. The absence of critical habitat does not mean that there is no adverse affect on a species.

MM-70

- During the relicensing period, the total amount of spent fuel at the Facility will continue to increase. Why is the long-term impact of this stockpiling not discussed in the DEIS and considered?

8.1 Alternatives

MM-71

- The Phase II rule has been challenged and is in any event inapplicable to the NJDEP permit decision. See the attached NJPDES comment letter for the ramifications on NRC's conclusions.

MM-72

- It is incorrect to say that a modified one-through cooling water system with mitigation/restoration would lessen the impact. This can only be determined once the restoration plan is in place. Mindless restoration of tidal marshes will not do anything to mitigate the adverse impacts the Facility is having on certain populations of fish.

MM-73

- NJDEP has not finalized the NJPDES permit. Restoration is not technology and it is not a viable alternative. In addition, the analysis of the impacts of the modified once-through cooling system is subject to all the same criticisms. NRC cannot conclude that restoring wetlands will have *long term benefits* to the Bay unless it knows what it is trying to accomplish and how that can be done.

8.2 No Action Alternative

MM-74

- All of the adverse affects over the past 40 years will continue for the period of relicensing. The ecosystem may rebound if the Facility is not relicensed. After admitting that the construction of the intake and discharge canals destroyed the ecosystem, how can NRC conclude (8-35) that the cessation of those impacts will be small?

MM-75

- NRC should consider EPA's responses to concerns about salt, icing and fogging at the Brayton Point facility in Massachusetts when determining the impacts associated with cooling towers (see attached NJPDES comment letter). Did NRC consult with EPA on the assessment of the alternatives? Or is NRC relying on information supplied by the applicant?

8.3 Alternative Energy Sources

- What is the basis for NRC's assumption that New Jersey will need to replace the Facility's power generation? MM-76
- Excluding all of New Jersey's potential for clean energy and energy efficiency programs, a PJM regional electricity grid assessment of transmission requirements to the New Jersey Board of Public Utilities (NJBPU) shows that Oyster Creek's retirement by the end of its current operating license in 2009 will require one transmission line upgrade. (PJM Report, attached). The PJM assessment also shows that if Oyster Creek retires in combination with the expected retirement of other aging coal plants, the solution is likely new transmission lines or transmission line upgrades. However, with proper planning, the electricity generated by Oyster Creek, 1.7% of the electricity consumed on the PJM Mid-Atlantic regional electricity grid, can easily be replaced through a combination of proper use of efficiency and conservation measures, as well as clean, safe, renewable power like wind and solar. MM-77
- The NJBPU, in conjunction with many state agencies, including the NJDEP, has begun developing a regional Energy Master Plan that examines the state's energy needs for the next 20 years. Throughout this process, New Jersey regulators will be making decisions about what is needed to meet New Jersey's energy demand. They will consider impacts to both the environment and the economy and will assume that plants will likely be retired, including Oyster Creek and several aging coal plants. In addition, several measures recently adopted by the legislature and the NJBPU will deliver substantial energy savings and increase renewable energy development. MM-78
- New Jersey just adopted one of the strongest clean energy standards in the country, ensuring that 20 percent of electricity consumed in the state comes from clean sources, primarily wind and solar, by 2020. In addition, Governor Corzine also has a goal of reducing energy consumption by 20 percent by 2020. MM-79

Conclusions

For the reasons articulated in this comment letter, NRC should not and cannot make any conclusions about either the environmental impact associated with the proposed relicensing of the Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA. MM-80

We thank you for the opportunity to submit these written comments.

Appendix A

Sincerely,

By: Julia L. Huff, Esq. / R2
Julia LeMense Huff, Esq.
Rutgers Environmental Law Clinic, Counsel to the Coalition

From: Tom Jones [tdj51@comcast.net]
Sent: Tuesday, September 05, 2006 7:28 PM
To: oystercreekEIS@nrc.gov
Subject: Relicensing of the plant

1. My wife and I want to voice our concerns and objections to the relicensing of the nuclear power plant in Lacey Township, NJ. We have read about the issues from both sides and remain convinced that the management is not doing enough to protect the environment and public safety. The plant's radioactive gas waste emissions that are dumped into our air and surrounding waters are a danger. Many local officials have gone on record as saying they also are opposed.

NN-1

Please consider the consequences of your actions for the future of the communities surrounding this area and the children who will be exposed years from now.

NN-2

Sincerely,

Tom D. Jones



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RULES AND DIRECTIVES
BRANCH
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Chief, Rules and Directives Branch
Division of Administrative Services
Mail Stop T-6D59
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Sir:

Section 4.1 (Environmental Impacts of Operation: Cooling System) of the Generic Environmental Impact Statement (GEIS) regarding the license renewal for the Oyster Creek Nuclear Generating Station (OCNGS) has several major flaws that invalidate its overall conclusions on aquatic ecological effects. Of particular note is the lack of bay population surveys and associated population databases collected during the past 30 years to compare against impingement and entrainment losses of organisms at the OCNGS. Bay population surveys and impingement and entrainment sampling must be conducted concurrently. Without these databases – notably recent databases – there is no way to accurately determine the true impact of the OCNGS on aquatic communities in the bay. The only valid assessment of OCNGS impacts on aquatic populations in Barnegat Bay was conducted during the 1975-1977 period when the last population samples were collected in the bay concurrently with impingement and entrainment samples. The results were reported in the OCNGS 316(a) and (b) Demonstration Report. In addition to relying on old and incomplete data collected 30 years ago, the NRC has failed to take into account the large natural variation in abundance of organisms in the bay, as well as the variation of organisms impinged and entrained at the OCNGS, which can exceed 100-300% annually. Ideally, therefore, population surveys in the bay should be conducted annually, or at least every five years, together with impingement and entrainment sampling. Let me reiterate, the GEIS assessment of cooling system impacts on the aquatic ecology of the bay (Section 4.1) cannot be accurate because population surveys in the bay have not been conducted concurrently with impingement and entrainment sampling at the OCNGS since 1977. Consequently, the conclusions of the GEIS regarding OCNGS impacts on aquatic communities in Barnegat Bay are invalid and irrelevant.

SUNSI Review Complete *F-REDS = ADM-03*
Call = M. Musnick (MTH2)

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

Template = ADM-013

The aforementioned deficiencies call into question several statements advanced by the NRC that marginalize or minimize entrainment and impingement effects. For example, on page 4-15 the statement is made that, "There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource." Because no population surveys have been conducted since the 1975-1977 period, there is no way this statement can be correct, especially with regard to current losses and probably future losses as well. It certainly cannot be substantiated by the deficient databases that now exist. Furthermore, there is clear evidence of a dramatic decline of both the hard clam (*Mercenaria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*) populations in the bay. Both of these species, with early life stages cropped by the OCNCS, were listed as Representative Important Species in the 316(a) and (b) Demonstration Report submitted to Federal and state government agencies in 1978. These populations in the bay have not been effectively tracked over the past 30 years. The same comments above (albeit for different species) also apply to the following statement on page 4-21 of the GEIS: "There is no evidence to suggest that past, current, or future impingement of these species would destabilize or noticeably alter any important attribute of the resource." The lack of bay surveys during the past three decades, therefore, undermines the fundamental conclusions of the GEIS with regard to minimal impacts of impingement and entrainment of the OCNCS on aquatic populations in the bay.

OO-3

OO-4

There is a specific reference to one of my published articles on the Barnegat Bay-Little Egg Harbor Estuary that has been cited three times in the GEIS in support of the NRC conclusions of no significant impact of the OCNCS on Barnegat Bay aquatic populations. The cited work is found on pages 4-15, 4-21, and 4-51 and includes statements taken directly from the following publication (Kennish, M. J. 2001. State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*, Special Issue 32, pp. 243-273.). I want to stress that this cited work is a review article, and the words quoted in the GEIS are taken out of context, thereby misconstruing the information. More specifically, my article only supports the results of impingement, entrainment, and thermal discharge effects determined for the 1975-1977 period, the only period when impingement and entrainment data were collected concurrently with data population surveys in the bay. Thus, it is only relevant to a very small window of time – the two year period from 1975-1977 – rather than to the entire operating period of the OCNCS (1969-Present). Therefore, I object to, and contend, the use of the three quotes from my published article in the context shown on pages 4-15, 4-21, and 4-51 of the GEIS.

OO-5

Appendix A

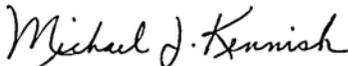
OO-6

The GEIS also infers that more recent findings from an extensive review of available published information (academic journals or other sources) by the NRC staff did not contradict the agency's finding of no significant OCNGS impacts on aquatic populations in the bay. However, there have been few studies published in peer-reviewed journals which deal with OCNGS biotic impacts in any form during the past two or three decades. It is incumbent on the NRC, therefore, to document and list for public examination the published academic journal articles that it notes support the findings of the GEIS regarding the lack of significant biotic impacts of the OCNGS. The NRC should not only list the titles of the published articles but also the journal names and authors, and the relevant page numbers. I have already indicated that my publications relevant to this issue are review articles addressing findings of the 316(a) and (b) Demonstration published nearly 30 years ago.

OO-7

Finally, and perhaps most importantly, the GEIS has not been reviewed and assessed by a reputable independent scientific body such as the National Academy of Science. If a scientific committee of the National Academy of Science had been solicited to review the sampling design and procedures of AmerGen and previous plant owners and allowed to submit recommendations of a new sampling plan, the flaws recounted above in the aquatic environmental databases of the OCNGS could have been circumvented. The lack of an external review of the GEIS by an independent scientific body creates skepticism not only in the scientific community but also in the lay community. The credibility of the GEIS and the NRC effort related to the license renewal process of the OCNGS really depends on an acknowledged objective and effective review by a credible independent body not affiliated with AmerGen or any government agency. Such a review is necessary to ensure scientific rigor of the licensing process. The NRC's work on the OCNGS will not be accepted or approved by the scientific community without such an external review.

Sincerely,



Michael J. Kennish, Ph.D.
Associate Research Professor
Institute of Marine and Coastal Sciences
Rutgers University
New Brunswick, New Jersey 08901

September 11, 2006

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulation Commission
Mail Stop T6-D59
Washington, DC 20555-0001

RE: **Oyster Creek Nuclear Generating Station
Generic EIS for License Renewal of Nuclear Plants**

Comments

Dear Sir or Madam:

The New Jersey Department of Environmental Protection (NJDEP) has completed its review of the Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants regarding Oyster Creek Nuclear Generating Station. We offer the following comments, for your consideration, regarding existing and potential adverse impacts to the environment State of New Jersey associated with the continued operation of the generating station.

COMMENTS

Radiation Protection

The NJDEP's Radiation Protection and Release Prevention Element's (RPRP) review of the GEIS has resulted in the following comments and concerns, which are, directed to specific impact areas.

Plant and the Environment, Gaseous waste processing systems and effluent controls (Pages 2-11 to 2-12)

The GEIS states that "continuous radiation monitoring is provided at various points in the system" and that "all gaseous effluents are within the NRC regulatory limits". There is no discussion of the operability/inoperability of the augmented offgas system (AOG) which over the past few years has not functioned at 100% at all times. Operating the AOG at or near 100% will provide

PP-1

the public with confidence that any offsite releases are kept as low as reasonably achievable and well below NRC regulatory limits. It is therefore important that AmerGen commit to high reliability of the AOG at or above 90%.

PP-2

Plant and the Environment, Radiological Impacts (Page 2-75)

Following is a clarification of the Department's Environmental Sampling and Monitoring Program (ESMP). Data are collected not only beyond the owner controlled area, but at various locations onsite:

- Groundwater sampling is done within the OCNGS site boundary. Tap water is sampled from the OCNGS site Administration Building
- Direction radiation measurements using Thermoluminescent Dosimeters are taken at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage facility.
- Continuous Radiological Environmental Surveillance Telemetry – Three portable ion chamber devices (CREST monitors) measure direct radiation at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage Facility.

PP-3

Environmental Impacts of Operation, Heat Shock (Page 4-23, Lines 4-7)

"...shall not be raised by no more than 2.2 degrees C (4 degrees F) from June through August, nor more than 0.8 degrees C (1.5 degree F) from June through August..."

This statement conflicts.

PP-4

Environmental Impacts of Operation, Thermal Plume extent violations (Page 4-23)

Supplement 28 to the Draft SEIS is not clear on what the outcomes of the violations were.

PP-5

Environmental Impacts of Operation, Transmission Lines (Pages 4-25 through 4-31)

New Jersey's original draft power line regulation addressed only new or modified lines. The policy of prudent avoidance was used as a basis for the draft. Therefore, only new or modified power lines were to use mitigation techniques to lower magnetic fields. (It was assumed that more of these fields were worse.)

Many years later, research results are still contradictory in this area. The International Commission on Non-ionizing Radiation recommends 833 milligauss as a public exposure limit, based on acute effects. No power line in New Jersey

will have levels that high underneath them. IEEE recommendations are even less conservative.

PP-5
(contd)

Since no new transmission lines are within the scope of this GEIS (2-15, line 25 and 26), it would not be recommended that the utility take any action to reduce magnetic fields.

The RPRP does not see any data in the report that indicates what the magnetic fields are under or at the edge of the ROW (average and maximum). The Department is requesting this information in order to respond to public inquiries. The Department is concerned that electric current could substantially increase over the years thus increasing the magnetic field under the line. What is the utility's plan for this eventuality?

Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31)

PP-6

"Radiation doses to the public will continue at current levels associated with normal operations"

Another twenty years of operation will impact the size of the interim spent fuel storage facility. What are the dose estimates for what the public might be exposed to at the fence line throughout the operation of the OCNGS ISFSF pending the siting of a permanent repository?

Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31)

PP-7

During normal plant operations, a certain portion of effluent from the discharge canal is recirculated back through the intake canal. This recirculation may potentially contain radioactive material from the OCNGS that can settle in the aquatic sediment in the intake canal and Forked River. Was sampling of aquatic sediment in the intake canal performed to assess any potential impacts?

Environmental Impacts of Postulated Accidents (Pages 5-1 through 5-11, Appendix G)

PP-8

In light of NRC approved NEI 05 01 (rev A) Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document, AmerGen should revise the draft SEIS. The submittal did not include a specific review for Individual Plant Examination for External Events (IPEEE). The information used to develop the basis for external events such as tornados, floods, earthquakes, fires, and sabotage is 10 years old. Additionally, while Amergen did use specific information for the internal Individual Plan Examination, they did not use the same method for the IPEEE and simply applied a factor of 2 to make a risk determination. This method is clearly imprecise and may result in incorrect

judgments. The list of potential fixes to improve the plant, which is located in Appendix G of the GEIS, may not be accurate as a result of this generic analysis.

PP-9

Finally, the Severe Accident Mitigation Alternatives (SAMA) submitted by AmerGen, while in compliance with NRC's regulations but not with guidance document NEI 05 01 (rev A), did not take into account terrorism events such as attacks involving large commercial aircraft. As the NRC is aware, the State of New Jersey has filed a contention with the Atomic Safety Licensing Board (ASLB) regarding this issue. While the ASLB argued that under the National Environmental Protection Act, license renewal does not have to consider very low probability events, after September 11, 2001, these events can no longer be considered zero probably. At present, the NEPA-terrorism debate continues with the NRC Commissioners' review of the SAMA contention. The Ninth Circuit Court decision held that the NRC cannot categorically refuse to perform a NEPA-terrorism review. The legal process will continue until resolution which may result in the Ninth Circuit Court decision being upheld thereby requiring the NRC to include terrorism in NEPA reviews. Judgments on the state's contention regarding SAMA seem relevant for the continued operation of the Oyster Creek Nuclear Generating Station (OCNGS) and should be included for public assurance of the continued safe operation of the OCNGS.

As Commissioner Gregory B. Jaczko stated in a Memorandum and Order docketed on September 6, 2006, that considered the appeals of two prior ASLB decisions, an evaluation of terrorism events should be part of NEPA and that this process should start immediately in order to provide the necessary clarity for all future re-licensing of nuclear power plants.

PP-10

The Department is requesting that NRC make the OCNGS spent fuel pool (SFP) vulnerability analysis available to the Department since the SAMA does not include security requirements pertaining to the revised design basis threat analysis, including SFP vulnerability and aircraft attacks.

PP-11

Environmental Impacts of Decommissioning, (Pages 7-1 through 7-5)

10 CFR 50.75(g) requires AmerGen to keep "records of information important to the safe and effective decommissioning" of the plant. Since Oyster Creek is at the end of an initial license, seeking re-licensing, the Department is requesting a copy of the OCNGS's 50.75(g) file.

PP-12

Alternatives, Description of the Closed-Cycle Cooling Alternatives (Pages 8-5 through 8-6)

Would the excavation of piping have any effect on any of the existing groundwater monitoring network?

Alternatives, Environmental Impacts of the Closed-Cycle Cooling Alternative, Terrestrial Ecology (Pages 8-6 through 8-21)

PP-13

During the planning of the proposed Forked River Nuclear Station in the 1970's, the EIS study was done for a different type of cooling tower (draft rather than linear hybrid model), different location and different release point/height. Therefore, the comparisons about salt deposition patterns described in Supplement 28 may be different and therefore produce different results.

Environmental Impacts of the Closed-Cycle Alternative, Land Use (Page 8-8)

PP-14

We are not aware of any decision based on CAFRA that would preclude the construction of the cooling basin and towers.

Summary of Environmental Impacts of a New Nuclear Facility Using Closed-Cycle Cooling at the OCNGS Site and at an Alternate Site (Tables 8-1 and 8-7)

PP-15

Environmental impacts of a new nuclear facility using closed-cycle cooling either at the OCNGS site or an alternative site in some cases are listed as SMALL to MODERATE or even MODERATE to LARGE in Table 8-7. Yet, environmental impacts of the current once-through cooling system and closed-cycle cooling alternatives in Table 8-1 both resulted in mostly SMALL impacts. Can you elaborate on the reasoning for choosing the MODERATE and MODERATE to LARGE impact ratings for a new nuclear facility with a cooling tower constructed on the OCNGS site? It seems that at least more of these impacts would be SMALL.

Natural Resources

The NJDEP's Division of Fish and Wildlife's (DFW) review of the GEIS has resulted in the following comments and concerns, which are, directed to specific impact areas.

Biocide Usage

PP-16

The DFW has concerns about the cumulative impact of the use of chlorine and biocides on estuarine organisms. No mention was made if any studies or modeling has ever been performed to examine potential long-term impacts of this procedure.

Fishkill Measurements

PP-17

The DFW has some concerns regarding the methodology used to measure fishkills. Entrained fish eggs and fish larvae are subjected to extremely

PP-17
(contd)

high temperatures where mortalities are high. Cold shock due to unexpected shutdowns results in more fish mortality than observed or reported. When a plant shuts down and a fish kill occurs, dead fish are collected and enumerated. What is not observed are the schools of fish that follow the last "pocket" of warm water discharge out Oyster Creek and into Barnegat Bay. During the winter, as that "pocket" of warm water is cooled to the temperature of the water around it, those remaining fish (now off site of the OCNGS) and in Barnegat Bay, succumb to thermal shock. During the winter, the cold water slows the decomposition process down dramatically, and the dead fish sink to the bottom. The extent of this mortality should be evaluated.

PP-18

Fishkill Mitigation

Pages 2-21 and 4-7 address fishkills related to plant shutdowns. It should be stressed that whether such fishkills occurred during planned or unplanned shutdowns, any resultant fishkills are subject to the assessment of fines.

PP-19

Mesh Size Measurements

Several present DFW staff members took part in the '84-'86 study before joining the DFW. The DFW believes that there are statements in the report that are misleading and require some clarification. Pages 4-18 to 4-19, suggest the EA study over underestimated catch due to mesh size not matching mesh size of Ristroph screens. The GEIS indicates that 10.7 mm was used on sampling gear for nine years, 6.4 mm used for one year, whereas mesh size on screens was 9.5 mm. The DFW staff believes all openings except for the last year were 3/8" (this is 9.5 mm). The difference is how mesh size is measured and whether or not the wire around each individual panel is included. The DFW believes that measurements reported by environmental assessment included the thickness of wire surrounding each opening (because that's how it was ordered from the supplier at the time), which would add another mm or so to the width. Pages 4-18 to 4-21 - the 6.4 mm wire mesh utilized in the pool, the DFW believes, it would not have mattered what size was used on the fabric mesh of the collection net, since anything in the sluiceway experienced the effects of the screening process and would have been retained in the pool. Water in the sluiceway could have been sampled with 1/2" mm mesh and the method still would have been valid because the sample would end up in the pool and be processed.

PP-20

Important Fish and Shellfish (Section 2.2.5.3)

Important Fish and Shellfish near the OCNGS are discussed in Section 2.2.5.3. Along with a "species profile" for important species in the area, the GEIS includes the general statement (or variation thereof) that "primary anthropogenic stressors include hydrologic changes resulting from water diversion or water withdrawal activities." This water diversion/withdrawal (up to 1.25 million g.p.m.) is the principal source of the DFW's concern, yet in many respects is dismissed,

perhaps as an unavoidable adverse impact in the opinion of some. Other potential sources of impact typically mentioned include eutrophication and stormwater runoff, which are probably included for completeness but may be included to divert attention away from the potential factor that is the focus of the GEIS. This section of the report also notes whether or not essential fish habitat for a particular species has been designated for Barnegat Bay and seems to infer that if there is no such essential fish habitat (EFH) designation, that species is not an issue for the OCNCS. Given the huge volumes of water taken in by the once-through cooling system and the losses of various fish and invertebrate species through impingement and entrainment mortality, it seems plausible that the plant operation is impacting the estuarine food web of Barnegat Bay in some manner even though there as yet may not have been significant, documented impacts to specific species. Has any effort ever been made to look at long-term impacts to the food web of the bay?

PP-20
(contd)

Pool Abundance Estimates

On page 4-18 - the statement that the pool being an overestimate of abundance, DFG staff disagrees mainly because smaller, soft-bodied fishes (e.g. bay anchovies) could go through the 3/8" mesh of the screens (i.e. go head first instead of being sideways), be crushed or eaten, be trapped between then screens and feeding predators, get mangled in eel grass and therefore not end up in the sluiceway to be counted. If anything, it is the opinion of our professionals that pool collections grossly underestimated abundance of smaller, soft-bodied fishes and macroinverts such as bay anchovies, silversides, sand and grass shrimp. So basically, the last year of sampling, which utilized the pool technology, was most likely more reflective of abundance than in previous years (not an overestimate as stated in the NRC report), but it still underestimated numbers of small fish and small macroinvertebrates.

PP-21

Entrainment of Phytoplankton and Zooplankton (Page 4-7)

The DFW does not agree with the following: references the General EIS for power plants and concludes that 'entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants'---a remarkable conclusion based on the losses to benthic infauna (including hard clams) as noted in the GEIS.

PP-22

Dissolved Oxygen Issues (Page 4-8)

The DFW requests additional information on the position stated on this page, "that low D.O. has been a problem at one nuclear power plant with a once through cooling system, but that it has been effectively mitigated." This section further adds that low D.O has not been a problem at plants with cooling towers or cooling ponds. Has low D.O. ever been an issue at the OCNCS and if so, how was this situation mitigated? Or does it require mitigation?

PP-23

PP-24

Fish and Shellfish Entrainment Mitigation (Page 4-11)

It is noted that "entrainment of fish and shellfish into the cooling water system is a potential adverse impact." This section notes that as part of the permit renewal process, the applicant may be required to alter the intake structure, redesign the cooling system, modify station operation, or take mitigative measures as a result of this regulation." The GEIS should be considering all these actions and in any case should require mitigation for the fish and shellfish resources impacted by the relicensing of the OCNGS.

PP-25

Entrainment Losses (Table 4-3, page 4-13)

The Versar report (1989) noted that blue crabs and hard clams were the two species of both recreational and commercial importance impacted by the OCNGS. Table 4-3 (page 4-13 of GEIS) indicates that the annual entrainment losses for the studied period of 1975-1981 for blue crab larvae was 182 million organisms. Annual losses for this same period for hard clam larvae was 112.3 billion organisms. However, the GEIS makes little mention of the OCNGS impact on the bay's population of these two species. With respect to blue crabs, the GEIS discusses NMFS commercial blue crab landings and indicates that there is a thriving recreational blue crab fishery in Barnegat Bay, "suggesting that the population of blue crabs are currently sufficient to sustain both commercial and recreational uses." Using the current state of the recreational fishery to reach this conclusion seems somewhat of a "stretch".

Despite the huge losses of larval clams attributed to plant operation, in discussing the decline of hard clams in Barnegat Bay, the GEIS addresses a number of other factors, none of which include larval losses due to entrainment. It even include a reference to QPX disease, which typically occurs only in clams stressed by high density conditions---which is not the case in Barnegat Bay, where hard clam densities have fallen dramatically. For example, a survey of the southern portion of the Barnegat Bay System south of the Route 72 causeway (an area typically referred to as Little Egg Harbor Bay), hard clam stocks declined by two-thirds between the DFW surveys in 1987 and 2001. We may now be at a point of "recruitment limitation, "where densities are so low that the successful union of gametes released into the water is greatly diminished. With respect to declines in hard clam stocks in Barnegat Bay, the GEIS provides some interesting related data in its discussion of benthic infauna (pages 2-47/48). The GEIS notes that the densities of three benthic invertebrate species studied decreased from 9,000 to 17,000 individuals per square meter in 1969 to less than 500 individuals per square meter in 1973 (a decline of 94.1 to 97.1%). Coincidentally, the OCNGS began operation in December of 1969. It's not inconceivable that the entrainment losses reported for hard clams occurred for numerous larval organisms (both invertebrates and vertebrates), thereby having significant, albeit undocumented impacts on the bay ecosystem.

Mitigation Need

While impacts to some species are mentioned there is no accounting for the loss of various early life stage aquatic organisms and the loss of migratory birds and other terrestrial species cause as direct or indirect impacts to the plant and/or the transmission lines associated with the development. It is the DFW's position that some type of mitigation is required for these past negative impacts and for any future impacts arising from the granting of re-licensing. The DFW suggests that as part of the relicensing process an estuary enhancement program should be developed and implemented to mitigate for these past cumulative impacts and future impacts.

Estuary Enhancement Program Design

If an estuary enhancement program is developed, the DFW suggests that the following areas should be included into any mitigation plan:

1. Areas of potential restoration should be identified and slated for a program similar in design to the PSEG Estuary Enhancement Program. The DFW realizes that the potential for restoration is much more limited in the area of Barnegat Bay as compared to the Delaware Bay. All areas of marsh dominated with *Phragmites australis* or where hydrology may be restored to provide salt marsh habitat as part of the overall plan.
2. Work with the DFW's Bureau of Freshwater Fisheries to provide anadromous fish ladders at Manahawkin and Pohatcong Lakes and provide low flow fish passage at other low head dams located within the Barnegat Bay estuary.
3. Create a project within the Conserve Wildlife Foundation of NJ with a goal of being able to assess the use of Barnegat Bay and adjacent offshore areas by marine turtles, marine mammals and seals. Develop specific recommendations for their conservation in this area including measures for avoidance and/or minimization of cooling water intake losses. It appears as though many of the turtles reported at the plant come in during high easterly winds and/or drops in temperature (either the day before or day of capture). A modeling project could be developed to look at these factors, along with variables such as proximity of the Gulf Stream, to predict the times when turtles are most likely to be impinged. The plant should institute increased surveillance, including more frequent examination of the trash racks and canals (even include boat surveys), when turtles are most likely to be present.
4. Provide funding to the DFW's ENSP Bureau to evaluate the use of Right of Ways (ROWs) by Pineland snakes and federally protected avian species and develop specific recommendations for how ROWs can be managed within the Pinelands to benefit these species.

PP-26

PP-26
(contd)

5. Work with DFW on the restoration, preservation and mapping of submerged aquatic vegetation within Barnegat Bay.
6. Conduct a finfish inventory of Barnegat Bay for all life stages. This inventory would be of value for the development of baseline data to be better to assess positive and/or negative impacts of future actions.
7. Provide financial support on a yearly basis of the hard clam restoration project mentioned under Page 4-11 with consideration being given to including bay scallops as technology develops.
8. Financial support should be provided to the DFW to assist with funding for the Sedge Island Marine Conservation Zone educational programs.
9. Public Access - fishing, boat ramps, shoreline boardwalks and fishing piers (handicap accessible).
10. Provide additional funding for Artificial Reef projects expenses (vessel cleaning, procuring reef material, etc.).
11. Provide funding support for Clean Vessel Act pump out facilities/education.
12. Provide funding support for Youth fishing programs like HOFNODS.

If there are any questions concerning these comments please feel free to contact Donald Wilkinson of the DFW staff at (856) 785-2711.

Water Quality

The NJDEP's Division of Water Quality has the following comments on the draft GEIS. In most instances, an excerpt from the GEIS has been included after the comment and referenced page number along with any suggested changes where underlined text indicates an addition and strikethrough text indicates deletion.

PP-27

Page 2-20

Comment: The following additions will serve to clarify the appropriate regulations:

A provision of the CWA and NJPDES regulations allows facilities to continue to operate under an expired permit provided that the permittee makes a timely renewal application, which is the case with OCNCS.

In July 2004, the EPA issued Phase II regulations for existing electric-generating plants that meet eligibility criteria as set forth at 40 CFR 125.91 including a total design intake flow of 50 MGD or more...

PP-27
(contd)

Page 2-24

PP-28

Comment: The units seem to be in error and have been corrected below:

A concentration of 1000 μ g/L was measured, which exceeds the State limit of 70 μ g/L...

Page 2-28

PP-29

Comment: The following statement seems to make an erroneous reference as Warren County does not border Philadelphia.

To the northwest, Warren County (~~bordering Philadelphia~~) is designated as a sulfur dioxide nonattainment area...

Page 4-6

PP-30

Comment: The following statement is included on page 4-6:

These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants....

This finding concerns cooling-tower based dissipation system, which does not currently include OCNGS as it has a once-through cooling system. This should be corrected in any final document.

Page 4-11

PP-31

Comment: This statement should be clarified to reflect the lack of definition for adverse environmental impact in the Phase II regulations:

While adverse environmental impact is undefined in the EPA Phase II 316(b) regulations, Eentrainment of fish and shellfish into the cooling-water system is a potential adverse environmental impact...

Comment: The following sentence needs to be better worded and the threshold level of eligibility under the Phase II regulations should be included for clarification purposes:

PP-32

~~The rule is Phase II in the EPA's development~~ EPA has developed ef Phase II 316(b) regulations that establish national requirements applicable to the location,

PP-32
(contd)

design, construction, and capacity of cooling water intake structures at existing facilities that exceed a 50 MGD threshold value for water withdrawals....

PP-33

Comment: These sentences as written are factually incorrect in their description of the Phase II 316(b) regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards. In addition, compliance with any performance standards is not required at the time of permit renewal although any issued permit could attain a schedule for compliance. Suggested wording to correct these inaccuracies is as follows:

This rule allows for five compliance alternatives where two of these alternatives concern attainment of the ~~—The new~~ performance standards are designed to significantly reduce entrainment losses resulting from plant operations...

Licensees are required to demonstrate compliance with the Phase II regulations ~~performance standards~~ at the time of renewal of their NPDES permit...

PP-34

Page 4-12

Comment: A reference to a later part of the document should be included to ensure that the reader understands that these underestimates were accounted for.

Thus, on the basis of the Summers et al. (1989) analysis, it is possible that the entrainment numbers presented by EA (1986) were underestimates of actual entrainment. However, as described on page 4-14, these numbers were adjusted for the purposes of evaluating impacts...

PP-35

Page 4-13

Comment: Because there is documented entrainment survivability via the dilution pumps, as referenced in studies conducted at OCNCS, a clarifying statement that the estimation of impacts via the Versar report is conservative should be included.

Because the 316(a) and 316(b) demonstration report did not provide estimates of circulating-water system macrozooplankton entrainment losses for each year or estimates of dilution pump entrainment losses, Summers et al. (1989) conservatively estimated losses by assuming a 100 percent mortality rate for all entrained organisms (circulating-water system and dilution pumps)...

PP-36

Page 4-15

Comment: On page 4-15, the following is stated with respect to entrainment losses and the resulting conclusions of the Summers et al 1989 report:

...This assessment (Summers et al 1989) was based on population and ecosystem modeling (equivalent adult model, production foregone model, and spawning/nursery area of consequence model) to determine the environmental consequences of impingement and entrainment. The results of these models evaluate the combined losses associated with both impingement and entrainment. Using conservative assumptions to estimate OCNGS impingement and entrainment losses, data available on population sizes, and survival rates and trophic relationships, Summers et al. (1989) concluded that population losses were rapidly compensated for by reproduction (e.g. sand shrimp), were a small fraction of the bay population (e.g., blue crab and winter flounder), or had little effect on higher trophic levels (e.g., bay anchovy and opossum shrimp).

Although NJDEP (2005) acknowledged the Summers et al. (1989) conclusion that OCNGS did not appear to produce "unacceptable, substantial long-term population and ecosystem level impacts," the agency stated that it is not necessary to prove that an impact on a population is occurring to require the applicant to meet Section 316(b) performance standards....

While this excerpt is not incorrect, it is important to reference relevant regulatory changes that have occurred since the release of the Summers et al report in 1989 and the resulting 1994 NJPDES permit that provide the background for this position as contained in the draft NJPDES permit. Due to the fact that the EPA Phase II section 316(b) regulations focus on plant data (i.e. impingement and entrainment data), biological monitoring that feeds into any assessment of effects to bay-wide populations is not directly relevant for the purposes of the Phase II section 316(b) regulations at this time. Prior to the release in 2004 of the EPA Phase II section 316(b) regulations, a study of any effects on biological populations was a focal point of the document entitled Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 (U.S. EPA, 1977). In contrast, the 2004 EPA Phase II section 316(b) regulations uses a reduction in impingement and entrainment as the metric for complying, where in some compliance alternatives the goal is the attainment of national performance standards, and impacts to populations are not considered.

As described in the Department's comments to EPA Headquarters on the draft Phase II section 316(b) regulations, the Department expressed concern about a population focus as opposed to a focus on impingement and entrainment effects. This was due to the fact that results of biological population studies and modeling can be very subjective because it is difficult to identify, measure, and attribute the impact of each of the many variables (e.g. fishery regulations, climate effects) affecting populations of each of the impacted species. Rather than engage in this kind of biological debate, time and resources would be better spent focusing on the magnitude of the impingement and entrainment losses in relation to the

PP-36
(contd)

PP-36
(contd)

costs and benefits of implementing various technologies to avoid or minimize the impact.

The Department agrees that biological data is useful in monitoring the health of the estuary and acknowledges that both plant-related data and biological data of Barnegat Bay are dated. Nonetheless, the Department determined that this data was sufficient for the purposes of developing a section 316(b) determination in its 2005 draft NJPDES permit. The Department hereby questions USNRC if adequate data is typically found at other power plants that are the subject of a license renewal.

PP-37

Comment: As written the statement that there is no "clear" definition could be misconstrued to an understanding that there is "no" definition for calculation baseline or that any such definition is implied. Because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity. In addition, the word mortality should be stricken to be consistent with the wording in the national performance standards as contained at 40 CFR 125.94(b)2. Suggested changes are as follows:

The entrainment performance standards in the EPA's Phase II regulations requires that entrainment ~~mortality~~ for all life stages of fish and shellfish be reduced by 60 to 90 percent from the calculated baseline, although there is ~~no clear definition of~~ ambiguity as to how the baseline is to be calculated....

PP-38

Comment: On page 12 of the draft NJPDES permit, the Department states that closed-cycle cooling and restoration are the only means available at this time to reduce or offset entrainment losses. As such, the following statement should be clarified to be consistent with the draft NJPDES permit:

Based on the results of this and other studies, the State of New Jersey may require additional mitigation measures, such as the installation of cooling towers or restoration, to reduce or offset entrainment....

PP-39

Page 4-16

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

Regardless of the determination of impact, compliance with EPA's Phase II regulations may require modifications to the facility and/or the implementation of restoration measures.

Comment: It is important to make the distinction that there is no definition of adverse environmental impact contained in the Phase II regulations. This statement should be clarified as follows:

PP-40

While adverse environmental impact is undefined in the Phase II regulations, † impingement of fish and shellfish into the cooling-water system is a potential adverse environmental impact.

Comment: These sentences as written are factually incorrect in their description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the word "losses" should be substituted with "mortality" to ensure consistency with the wording in the national performance standards. Suggested wording is as follows:

PP-41

This rule allows for five compliance options where two of these options concern the attainment of~~The new performance standards are~~ designed to significantly reduce impingement mortality losses resulting from plant operation. Licensees are required to demonstrate compliance with the Phase II regulations ~~performance standards~~ at the time of renewal of their NPDES permit.

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

PP-42

As part of the NPDES renewal, licensees may be required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures, which could include restoration measures, as a result of this regulation.

Page 4-19

PP-43

Question: It is unclear from the following statement as to who's conclusions are summarized in the paragraphs that follow this section and the age of any documents and/or data reviewed.

The NRC staff also compared its assessment of impacts with the conclusions stated in Kennish (2001), because the author has reviewed most of the information available to the NRC staff. A summary of the conclusions associated with impingement impacts follows.

Page 4-21

PP-44

Comment: As stated previously for page 4-15, the following statement that there is no "clear" definition of calculation baseline could be misconstrued to an

PP-44
(contd)

understanding that there is "no" definition for calculation baseline or that any such definition is implied. However, because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity as follows:

The impingement performance standards in the EPA's Phase II regulations requires that impingement mortality for all life stages of fish and shellfish be reduced by 80 to 95 percent from the calculated baseline, although there is no clear definition of ambiguity as to how the baseline is to be calculated....

PP-45

Page 4-22

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and is separate than modifications to the facility, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

Regardless of the determination of impact, compliance with the EPA's Phase II regulations may require modifications to the facility or the implementation of restoration measures.

PP-46

Comment: Because the operating license for OCNCS expires on April 9, 2009, this statement contains erroneous dates for the expiration date of the operating license.

The fact sheet describes the principal facts and the significant legal and policy issues considered by NJDEP during the preparation of the draft permit that will govern activities at OCNCS until the permit expires on April 30, 2009 (the same date month that the current OL for OCNCS expires).

PP-47

Page 4-23

Comment: The statement regarding violation of surface water quality standards, and thereby necessitating a thermal variance, was not contained in the July 19, 2005 fact sheet but rather was contained in the 1994 NJPDES permit fact sheet. Therefore, this statement should be modified as follows:

The results of the overflights demonstrated that the thermal plume extent and width often violated State surface-water quality standards, thereby requiring a thermal variance, as described in the NJDEP (1994 2005) fact sheet.

PP-48

Page 4-24

Comment: On page 4-24, the following is stated:

Summers et al (1989) also were critical of the hydrodynamic modeling conducted to support the 316(a) demonstration and concluded that the two-dimensional steady-state mass and heat balanced model used "...was a poor reflection of the dynamic conditions characterizing Barnegat Bay" and that "... the modeling regime chosen does not represent the best available methods for evaluating plume characteristics."

PP-48
(contd)

The NRC staff's conclusion is that the analysis conducted by Summers et al. (1989) provided the most realistic and complete description of thermal impacts associated with OCNGS and was taken into account during the NJDEP's development of the draft NJPDES permit.

The Department agrees that the Summers et al (1989) report did indeed recognize these shortcomings of the Section 316 demonstration. However, it seems as if the conclusions from the Summers et al (1989) report regarding the thermal discharge are missing and should be included prior to including the NRC staff's conclusion. Specifically, on page VIII-1 of the Summers et al (1989) report the following is concluded:

The Oyster Creek NGS does not comply with NJDEP's Surface Water Quality Standards for thermal discharges. However, present discharge effects are small and localized and have no adverse consequences to Barnegat Bay.

And, on page VIII-3 of the Summers et al (1989) report:

Based on the findings summarized in this report, balanced indigenous populations of Barnegat Bay are protected under Oyster Creek NGS's current operations (maximum BTU/hr of 5.42×10^9). Therefore, if the designated heat dissipation area was increased to the area currently occupied by Oyster Creek NGS's thermal plume, Barnegat Bay populations would continue to be protected,...

It seems appropriate to include some of these conclusions of Summers et al (1989) in this section.

Page 4-45

PP-49

Comment: The Department agrees that sea turtles are impinged at the OCNGS intake structure and has confirmed that the data presented in Table 4-13 is correct. However, information contained on page 4-52 is also relevant to this section and should be included as follows to ensure a full understanding of the issue:

Most impinged turtles at OCNGS are impinged on the trash racks associated with either the circulating-water or dilution-water intake systems. In many cases, the dead sea turtles captured at OCNGS appeared to have died elsewhere, and in

PP-49
(contd)

some cases, dead sea turtles exhibited wounds consistent with injuries from small boat propellers...

PP-50

Comment: A date should be included in the below excerpt to include a date as to when OCNCS procedures were revised.

Past difficulties in the preparation, storage, and shipping of turtles for necropsy have resulted in the loss of important data concerning the cause of death; recently, however, OCNCS procedures have been revised on [insert date] to correct these problems.

PP-51

Page 8-2

Comment: This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the national performance standards require a reduction in "impingement mortality" which is distinctly different than a reduction in "impingement". Suggested wording is as follows:

The EPA's Phase II regulations call for reducing establish five compliance alternative where two of these alternatives concern the attainment of a reduction in impingement mortality the number of organisms impinged at the intake structure by 80 to 95 percent of baseline, and reducing organisms entrained through the cooling system by 60 to 90 percent of baseline (EPA 2004a).

PP-52

Comment: This sentence as written does not accurately represent the NJDEP draft fact sheet. Specifically, NJDEP included a statement that the second alternative could only be pursued if closed-cycle cooling was "unavailable". Suggested wording is as follows:

The NJDEP indicated that if AmerGen Energy Company, LLC (AmerGen), can demonstrate that a closed-cycle cooling system is unavailable ~~not a feasible alternative~~ for OCNCS, AmerGen could implement another alternative, which is to "select, install, properly operate, and maintain a combination of design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures" endeavor to meet the national performance standards for impingement and entrainment.

PP-53

Page 8-3

Comment: This characterization of the second alternative as contained in the NJDEP draft permit fact sheet is incorrect. The second alternative does not only require restoration measures, but also requires improvements at the intake structure. In addition, while the Department made reference to wetlands

restoration as a viable restoration alternative, the Department did not limit the permittee to only this alternative. In addition, restoration measures are defined broadly in the EPA Phase II regulations. Restoration measures at OCNCS could include restoration measures, fish ladders, restoration of shellfish beds, preservation of lands etc. Changes are suggested as follows:

PP-53
(contd)

The second alternative considers a requirement to implement restoration measures, which could include the restoration of restore wetlands, coupled with improvements to the existing intake structure and operations.

Page 8-7 and 8-9

PP-54

Comment: In Table 8-1 a SMALL TO MODERATE rating is given for land use impacts associated with the modified existing once-through cooling system with restoration alternative. Likewise, in Table 8-, a SMALL to MODERATE rating is given for the historic and archeological resources category as follows:

Short-term adverse impacts to terrestrial resources would result from restoration activities and could range from SMALL to MODERATE, depending on location and size of the site chosen. Long-term benefits to terrestrial resources from restoration are anticipated.

A potential "MODERATE" rating for both these categories seems overly conservative. The implementation of any restoration measures would inherently involve careful consideration by the Department of appropriate lands and a minimization of any negative effects to any affected species. A "MODERATE" rating seems to assume that these factors will not be considered.

Page 8-9

PP-55

Comment: For the water use and quality category in Table 8-1, the Department has determined that it is premature and inappropriate to characterize all impacts on water use and quality as "small". As noted in the next statement, cooling tower blowdown would contain concentrated levels of chlorine and biocides that may not be used in the current once through system and may not necessarily result in an overall improvement in current surface water quality. However, the Department does agree that the implementation of cooling towers would result in a reduction of heat loading. To address this issue, this statement should be modified as follows:

Heat impact on surface water would be reduced from current level. Cooling-tower blowdown containing increased dissolved solids and intermittent low concentrations of biocides would be released; however, they would be diluted with the dilution-pump system.

PP-56

Page 8-10

Comment: In the socioeconomics category, there is no mention of benefits to tourism that may result from any restoration alternative.

PP-57

Page 8-12 – 8-13

Comment: The Department agrees that any reduction in impingement losses via a closed-cycle system as compared to a once-through system would depend on the species affected. However, it is not clear from this excerpt how this conclusion can be drawn. The following language is suggested to help bridge this gap in understanding:

Although impingement would be substantially reduced by using a closed-cycle this system, if it is assumed that a reduction in flow results in a corresponding reduction in impingement and entrainment, which is suggested by EPA in its preamble to the Phase II regulation, it is reasonable to assume that impingement would be reduced by 70 percent. However, because a closed-cycle cooling system does not require Ristroph traveling screens and therefore all organisms impinged would be killed, there would not necessarily be an overall reduction in impingement mortality via a closed-cycle cooling system as compared to the current system. Specifically, current documented levels of impingement survivability for Representative Important Species with the Ristroph traveling screens are around 88% which is higher than 70%. Therefore, impingement mortality could be greater with the closed-cycle cooling system. Any the reductions in impingement losses would only be evident for those species known to have high impingement mortality (e.g. , bay anchovy [Anchoa mitchilli], Atlantic silverside [Menidia menidia], and Atlantic menhaden [Brevoortia tyrannus]; see Section 4.1.2). Species with low impingement mortality (winter flounder [Pseudopleuronectes americanus], sand shrimp [Crangon septemspinosa], and blue crab [Callinectes sapidus]) would be less affected by this alternative. The reduction in flow may also reduce sea turtle impingements....

PP-58

Page 8-24

Comment: This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards.

The NJDEP identified construction and operation of a closed-cycle cooling system (Section 8.1.1) as its preferred alternative to demonstrate compliance with Section 316(b) regulations meet national performance standards for impingement and entrainment losses.

Comment: The excerpt below has several incorrect references to either the draft NJPDES permit or the EPA Phase II regulations. First, as stated above for page 8-3 referenced above, restoration measures in the draft NJPDES permit are not limited to only the restoration of wetlands since restoration measures are defined broadly in the EPA Phase II regulations. Secondly, the entrainment performance standard is compared against baseline conditions which should be referenced as it was for the impingement performance standard. Third, it would have been inappropriate for NJDEP to have included specific information in the draft NJPDES permit about viable operational or design changes to reduce impingement and entrainment given the fact that the EPA Phase II regulation requires for this information to be submitted in a Comprehensive Demonstration Study that is due on January 7, 2008. This should be appropriately referenced. Suggested changes are as follows:

PP-59

This alternative would reduce impingement and entrainment losses by retrofitting the existing system with improved technology, altering operations of the system, and ~~restoring wetlands~~ the implementation of restoration measures within Barnegat Bay to meet national performance standards that require 1) reduction in impingement mortality for all life stages of fish and shellfish by 80 to 95 percent from baseline conditions, and (2) reduction in entrainment for all life stages of fish and shellfish by 60 to 90 percent from baseline conditions. In describing this alternative, the NJDEP ~~provided little information regarding operational or design changes that might be employed at OCNGS to reduce impingement and entrainment losses~~ acknowledged that there are limited design and construction technologies available to reduce entrainment at this time. An identification and analysis of appropriate design and construction technologies is due to NJDEP as part of a Comprehensive Demonstration Study in accordance with the deadline of January 7, 2008 as set forth by EPA in its Phase II regulations.

Pages 8-24 – 8-25

PP-60

Question: What is the source of the information to support the below excerpt? The Department is unaware of any recent analyses of these technologies for the site-specifics of OCNGS. Any source or indication of whose conclusions these are should be included.

Other possible modifications to the system that might reduce impingement include utilizing a newer traveling screen design (e.g., a multidisc screen system), installation of an acoustic deterrent system for fish, and optimization of the existing fish-return system to reduce damage to fish. The effectiveness of these technologies or operational changes in reducing entrainment and impingement is uncertain. As stated above, none of these alternatives are expected to reduce losses by even 50 percent.

PP-61

Page 8-25

Comment: The below excerpt concerning NJDEP's identification of 103 high priority sites is somewhat vague and should be made more specific. Suggested changes are as follows:

In its draft NJPDES permit for OCNCS, the NJDEP referenced the 1995 The Trust for Public Land's report entitled "The Century Plan: A study of One Hundred Conservation Sites in the Barnegat Bay watershed" identified 103 high-priority sites within the Barnegat Bay watershed that could be considered by AmerGen for restoration.

PP-62

Page 8-55

Comment: Any new coal plant, as discussed in the below excerpt, would be required to meet Phase I of EPA's section 316(b) regulations which applies to new facilities. The requirements for Phase I are significantly greater than those requirements for Phase II facilities and should be taken into account in any rating of impacts. This is corrected as follows:

This section discusses the environmental impacts of constructing and operating a coal-fired plant using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are similar to the impacts for a coal-fired plant using the closed-cycle system. However, there are minor differences in impacts between the closed-cycle and once-through cooling systems. Table 8-4 summarizes these differences. The design and operation of the intake would need to comply with Phase I ~~Phase II~~ performance standards of the EPA's section 316(b) regulations to minimize adverse impacts associated with water withdrawal and heated discharges would need to comply with Section 316(a) regulations.

Geology And Ground Water

The NJDEP's New Jersey Geological Survey has reviewed the Draft GEIS from the standpoint of geology and ground water. Below are some comments, section by section. Additionally, pages 80 to 83 of the testimony comments on the water diversion. Some of the comments below may actually answer some of those concerns.

Section 2.2.2, Water Use

PP-63

Page 2-19 fourth paragraph, indicates the two production wells on site have a water use registration for users of less than 100,000 gallons of water a day (gpd). On page 81 of the comments from the public hearing it is indicated that the statement was incorrect. The person making the comments indicated that it was the installation of equipment that could divert more than 100,000 gpd, which required a permit. A check of the water supply permits indicates that

Amergen Energy Co. has a "Water Use Registration" 11108W. Water Use Registrations are for systems that have the potential to exceed the 100,000 gpd due to the size of the pumps or the number of wells in the system but their use is under 100,000 gpd on a 30-day average.

PP-63
(contd)

The last paragraph, of the same page, states over the year that the usage is only 14gpm. It seemed unusual that site usage in this way. On page 2-20, second sentence, they indicate that extraction wells for the ground water remediation are discussed in Section 2.2.3. Yet in Section 2.2.3 here is no mention of the amount of water pumped by the ground water extraction system. If ground water is being pumped for the clean-up technically, those amounts should added into the plant Water Use Registration totals but there is no indication on the registration that there is any ground water pumping for a clean-up. If the 30-day average exceeded 100,000 gpd, then they would need a Water Allocation Permit.

It was not clear why the report made so much of the amount of water pumped at 14 gpm until page 4-43 was examined. There it is stated that "Plants using less than 100 gpm are not expected to cause any groundwater conflicts." The next paragraph indicates that as discussed in Section 2.2.2 the use is less than 100 gpm and "The NRC staff has not identified any new and significant information during its independent review of the AmerGen ER, the site visit, the scoping process, or the evaluation of other available information. Therefore, the NRC staff concludes that there would be no groundwater-use conflicts during the renewal term beyond those discussed in the GEIS."

Section 2.2.8.2, Public Services, Water Supply

PP-64

Some of the numbers on Table 2-9 maybe outdated. For instance, United Water has exceeded it allocation several times and has been trying to get an increase. They have activated their interconnection with Lacey Township MUA to supply some of their additional water requirements. Nowhere is a listing of other ground water diversions such as the Jersey Central Power & Light diversion.

Section 4.5, Groundwater Use and Quality

PP-65

This section indicates there are no groundwater-use conflicts, which seems to be based on the plant not pumping more than 100 gpm. Actually when the wells are pumping they each exceed the 100 gpm since they have 200+ gpm pumps. Also they cite "NJDEP 2005a" for pass-through cooling water for some pumps. This fact sheet on the discharge permits for the plant discusses some of water use for the plant. In the report, on a diagram of the water flows at the plant, the South Well is shown. For the South Well, it is indicated that the flows from the well can range from 3,000 to 103,700 gpd. The Draft GEIS does not show the North Well on the diagram. What also is not indicated there or in the report is the

PP-65
(contd)

any amount of ground water pumped by the ground water clean-up system. Another ground water pumpage at the plant site, which possibly may be used by the plant, is under Water Allocation Permit 2164P. This permit is for Jersey Central Power & Light and has a maximum rate of 1,100 gpm and 7.95 million gallons per month. The first three wells listed on the permit are DW-1, DW-2 and SW-1 which were drilled for the Oyster Creek Nuclear Plant in 1971 and 1973 to supply water to the plant. These wells are still permitted in the latest diversion permit for JCP&L after the selling the plant to AmerGen even though they were for plant water supply. It is not clear why JCP&L would have kept them under their permit since it is likely they still are interconnected to the plant. We doubt the original piping was removed after the sale of the plant. Is or can water pumped under the Jersey Central Diversion be used by the AmerGen plant? If so, then the fact that AmerGen reports 14 gpm averaged out over the year is moot. They could be using and pumping significantly more water from the site since it would be reported under a different diversion. Also there is no quantity being pumped for the ground water clean up.

Based on previous records, at times the plant can and will use more water than the AmerGen Water Use Registration permits. The records show in the 1990's there was at least one time the plant exceeded its monthly diversion of 7.95 mgm. It is not clear why they used that much water, but if the same conditions occur again the plant would likely use similar amounts of water

Section 4.8.5, page 4-55

The report again indicates that the plant water use of only 14 gpm is inconsequential and is well below the GEIS Category 2 threshold for ground water use of 100 gpm. Then at the bottom of the page they again state "... the NRC staff concludes that the cumulative impact on groundwater resources through water usage would be SMALL, and that additional mitigation would not be warranted." This statement cannot be evaluated until all the ground water pumpage and use at the plant quantified as discussed above under Section 4.5.

PP-66

Section 8.1.1.2, pages 8-14 & 8-15- The report indicates that during the construction of a closed-cycle cooling system the ground water usage would be negligible. They indicate that the water requirements, for potable water for the additional workers and for concrete was mixed on site, would be short and not exceed the existing registration. They also indicate that the underground parts of the construction would create a need for localized dewatering and require a permit.

First, during construction there is significantly more water use during construction than for potable water and for concrete. Significant amounts of water are used at construction sites for cleaning equipment as well as dust control. Also the construction would likely continue for months.

Second, the dewatering would require a diversion permit as the report indicates, but in aquifers like the Cape May and Cohansey (depending of the depth of any construction) the pumpage would be in the hundreds to thousands of gallons per minute. For the footing for the uncompleted Forked River Station the dewatering was pumping over 16,000 gpm. I do not know how deep the footings for cooling towers would have to go, but most likely they would be significantly below the water table. Also if there was any contaminated ground water in the area of construction most likely there would be some treatment and/or monitoring requirements attached to the permit.

PP-66
(contd)

Land Use

The NJDEP's Division of Land Use Regulation (DLUR) review comments follow.

Page 2-22, lines 10-16

The following statement appears, "Dredging of Oyster Creek and the Forked River is administered by the U.S. Army Corps of Engineers (USACE) and a Coastal Area Facility Review under the New Jersey Coastal Zone Management Act. Suction dredging has been performed to minimize the impact of the dredging, and dredged materials have been conveyed to the dredge spoils basin (Figure 2-3) using hard piping. During the license renewal period, periodic dredging may take place in the intake and discharge canals, the Forked River, or Oyster Creek. The dredging would be consistent with past techniques and requirements."

PP-67

Please be advised the permit required for dredging from the NJDEP would be a Waterfront Development Permit under New Jersey's Waterfront Development Law and not a Coastal Area Facility Review Act (CAFRA) Permit.

PP-68

Page 8-8, Lines 2-6

The following statement appears, "Construction of the cooling towers at the OCNCS is under the jurisdiction of New Jersey's coastal management program within the NJDEP's Division of Land Use Regulation. Current restrictions under the requirements of the New Jersey Coastal Area Facility Renewal Act (CAFRA) limiting the percentage of impervious surface area for Lacey Township preclude the construction of the cooling basin and towers (AmerGen 2006)."

It appears the applicant (AmerGen) is referring to New Jersey's Coastal Zone Management Rules (Rules, N.J.A.C. 7:7E-1.0 et. seq.), specifically to the Subchapter 5 Rules with regard to impervious coverage at a proposed project site. The applicant is correct the proposed facility would require a Coastal Area Facility Review Act (CAFRA) Permit. However, the Division is not aware of any

guidance given to the applicant as to whether Subchapter 5 Rules would "preclude the construction of the cooling basin and towers." In fact, the Division has met with the applicant to discuss placement of additional impervious coverage on the site at or in close proximity to the location the towers would be placed at. (See Figure 8-1) During the meeting, the Division provided guidance on a way to comply with impervious coverage rules.

Therefore, the Division requests the above cited statement; the statement in Table 8-1, Line 15; and any similar reference to Subchapter 5 impervious coverage rules be removed as not factual, unless there is documentation demonstrating the Division has previously advised the applicant that the percentage of impervious surface area would preclude the construction of the cooling basin and towers. If such documentation exists, then the Division reserves the right to review and comment on those document(s).

Thank you for giving the NJDEP the opportunity to comment on the document.

Sincerely,

Kenneth C. Koschek
Supervising Environmental Specialist
Office of Permit Coordination and
Environmental Review

C: Susan Rosenwinkel, NJDEP
Karen Tuccillo, NJDEP
Donald Wilkenson, NJDEP
Andy Heyl, NJDEP
Richard Dalton, NJDEP

September 14, 2006

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulation Commission
Mail Stop T6-D59
Washington, DC 20555-0001

RE: **Oyster Creek Nuclear Generating Station
Generic EIS for License Renewal of Nuclear Plants**

Supplemental Comments

Dear Sir or Madam:

The New Jersey Department of Environmental Protection (NJDEP) has the following supplemental comments on its review of the Draft Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants regarding Oyster Creek Nuclear Generating Station. We offer the following comments, for your consideration, regarding the environmental impacts associated with the proposed renewal of Oyster Creek's operating license. This letter supplements my letter of September 11, 2006.

COMMENTS

Land Use

The NJDEP's Division of Land Use Regulation (DLUR) review resulted in the following comments.

Page 4-7, line 1-13, the following statement appears:

Entrainment of phytoplankton and zooplankton - Based on information in the GEIS, the Commission found that:

Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.

The NRC staff has not identified any new and significant information during its independent review of the AmerGen ER, the site visit, the scoping process, the review of monitoring programs, or the evaluation of other available information. Therefore, the NRC staff concludes that there would be no problems associated with the entrainment of phytoplankton and zooplankton during the renewal term beyond those discussed in the GEIS.”

QQ-1 It is the DLUR's understanding the applicant has been conducting entrainment and impingement studies from approximately October 2005 to the present. The DLUR does not understand why this ongoing study does not represent a “new study” and how the NRC can conclude without reviewing the results of the on-going study, “that there would be no problems associated with the entrainment of phytoplankton and zooplankton during the renewal term beyond those discussed in the GEIS.”

Pages 4-12, Lines 26 & 27; Page 4-12, Lines 36 & 37

QQ-2 Several places in Chapter 4 indicate that the Summers et. al. (1989) analysis advises that numbers produced by EA studies were underestimated.

It is not obvious, when the GEIS discusses numbers of fish, invertebrates, plankton, etc., whether or not those numbers are based on EA's underestimated numbers or have been corrected to meet Summers estimates.

Appendix E

QQ-3 In Appendix E, there is an evaluation of species requiring Essential Fish Habitat (EFH) consultation. The DLUR offers the following comments on the winter flounder (*Pseudopleuronectes americanus*) evaluation.

The evaluation (E58–59) states, “OCNGS operations have the potential to adversely affect EFH for all life stages of winter flounder because all stages could occur in Barnegat Bay. Tatham et al. (1984) considered the winter flounder a resident species in Barnegat Bay that made significant use of the estuary for spawning and as a nursery area; the years of study (1975 to 1978) reflected a period when commercial landings in New Jersey waters ranged from 47.7 to 92.7 metric tons. These data appear to reflect a low point in the population based on data from 1979 to 2004, when catches usually exceeded 100 metric tons and were greater than 200 metric tons for seven years during that period (NMFS 2005). Winter flounder larvae represented between 1 and 10 percent of the annual OCNGS entrainment measured in studies from 1975 to 1981 (Summers et al. 1989).” ... “The total number of entrainment losses for winter flounder larvae for 1975 to 1976; 1977 to 1978, and 1980 to 1981 was 4330 million organisms (Summers et al. 1989).” ... “Winter flounder are also impinged on the OCNGS traveling screens. Annual impingement of winter flounder from 1975 to

1985 ranged from 8908 individuals in 1975 to 1976, to more than 148,000 individuals from 1978 to 1979, and the average annual impingement was estimated (EA 1986) to be 38,866 individuals during that period.”

The Atlantic States Marine Fisheries Commission (<http://www.asmfmc.org/>) has published a more recent report (Fishery Management Report No. 43 of the Atlantic States Marine Fisheries Commission Amendment 1 to the Interstate Fishery Management Plan for Inshore Stocks of Winter Flounder November 2005) on winter flounder. This report places New Jersey within the Southern New England/Mid-Atlantic (SNE/MA) Management Area for winter flounder. The report encompasses a large area, including New Jersey. The report states that within the SNE/MA the stock complex is overfished and overfishing is occurring based on updated NEFMC overfishing definitions.

In addition, the report provides the following information. “Commercial landings from the SNE/MA stock unit averaged 8,500 mt from 1964-1972 before declining to around 4,800 mt throughout the mid- to late 1970s. Commercial landings increased in the early 1980s to a record high of 11,176 mt in 1981 and remained at high levels through 1985. Landings rapidly declined after 1985 and reached a record low of 2,200 mt in 1994. Commercial landings in 2001 were 4,400 mt. Landings by distance from shore (<3 miles; 3-12 miles; >3 miles) were unavailable for 1994-1996 because of the switch from the NEFSC’s weigh-out system to the Vessel Trip Reports (logbooks). Commercial landings from the EEZ (>3 miles) averaged 86% of total commercial landings from 1989-1993, and the 2002 stock assessment notes that the majority of commercial landings from the SNE/MA stock continue to come from offshore areas (>3 miles).”

“Recreational landings from the SNE/MA stock complex peaked at 5,772 mt in 1984 before declining to 383 mt in 1992. Since 1992, landings have fluctuated without trend between 290 and 831 mt. In 2001, the recreational landings were estimated at 550 mt. Recreational landings as a percentage of total landings increased from 20% in 1982 to 44% in 1988, then declined to 20% in 1990. Recreational landings as a percentage of total landings have ranged from 10-18% since 1997. On average, recreational landings have comprised 23% of the total landings (1981-2001).”

“In order to restore the stock, the states in the Southern New England/Mid-Atlantic stock area must implement a recreational 12” minimum size limit and a 10-fish creel limit. Each state in the SNE/MA stock area may have a 60-day open season for recreational winter flounder fishing. In addition, 20 days must be closed to recreational winter flounder fishing during March and April. The 60-day open season can be split into no more than two blocks. While recreational fishermen in states within the Gulf of Maine (GOM) Stock must maintain the existing 12” minimum size and adopt an 8-fish creel limit. There are no required recreational closed seasons in the GOM stock area.”

QQ-3
(contd)

“Commercial fishermen within the Southern New England/Mid-Atlantic stock area must implement a 12” minimum size limit, a minimum 6.5” square or diamond mesh in the cod-end, and maintain any existing seasonal closures. In addition, the mesh size regulation includes a 100 lb. trip limit for winter flounder if smaller mesh is being used. This 100 lb. “mesh trigger” provides for the landing of a small amount of winter flounder as bycatch in smaller-mesh fisheries. While commercial fishermen in the Gulf of Maine stock area must maintain the existing 12” minimum size limit and remain consistent with the adjacent EEZ mesh size regulations. The current mesh size in the EEZ adjacent to the states in the GOM stock area is a 6.5” diamond or square mesh in the cod-end. States must maintain existing season closures, including any Federal rolling closures that affect state waters in the GOM stock area.”

Based on the above, it appears the winter flounder stock is in trouble in the SNE/MA and the Atlantic States Marine Fisheries Commission has taken measures to meet federal rebuilding requirements. This is somewhat of a different picture than presented in the GEIS.

It is interesting to note that Fishery Management Report No. 43, Section 1.4.1.3 entitled “Present Condition of Habitats and Habitat Areas of Particular Concern Status of the Habitat” presents three activities which have been identified as exerting long term deleterious effects on winter flounder and their habitat especially habitat areas of particular concern. They are: 1. Near-shore water quality degradation; 2. Suspended sediments; and 3. Entrainment and impingement from power plants and other activities.”

With regard to entrainment and impingement from power plants and other activities, the Report states: “Several extensive studies have been done on the impact of coastal power plants on winter flounder. Historically, many of these plants have been sited in the upper reaches of the estuaries where many winter flounder populations spawn and nursery. Power plant losses through entrainment and impingement of different life history stages are directly related to several factors: the location of the plant on the estuary, the type of system used for cooling the plant, volume of water used in cooling, and the type of technology employed to reduce mortality. Entrainment impacts are usually associated with egg, larval and juvenile life stages where individuals are small enough to pass through the intake screens and subsequently through the plant. Impingement affects mostly the adult stage, or the individuals large enough to be caught on the intake screens. Impingement mortality is typically lower as technologies have been developed and implemented to allow fish to be diverted from the cooling water and returned to the estuary alive. Mandatory monitoring programs required of the industry to assess the impact these plants have on fisheries resources and the estuarine environment have provided valuable data on winter flounder populations and have led to the development of new technologies to reduce power plant mortality on estuarine species. There are other types of

activities that potentially have similar impacts such as desalinization and water treatment plants.”

QQ-3
(contd)

Section 5.3 of the report is entitled Recommended (Non-Mandatory) Management Measures. This Section discusses that the recommendations included below correspond to the threats to habitat areas of particular concern outlined in Section 1.4.1 above. State fishery agencies should actively intervene to the extent of their authority to ensure that federal, state, and local permitting agents are aware of the loss in winter flounder productivity associated with water quality degradation and habitat loss and give full consideration to the following recommendations.

Recommendation #3 addresses concerns regarding Impacts by *Power Plants* (in addition water intake from desalinization plants, and water treatment plants). These recommendations include:

”Either encourage closed system plants or assist industrial siting councils in siting new plants to avoid winter flounder spawning areas;

When existing plants renew their permits or upgrade their technology, encourage closed system plants or other best available technology to minimize plant induced mortality.

Assess cooling water entrainment/impingement mortality at existing plants on a stage-specific basis for both local and regional flounder populations and use this information to address these impacts.”

As the evaluation relies on +20 year old impingement and entrainment data, the Division recommends the SEIS be updated to include the most recent findings on the state of winter flounder populations and State and federal government agency requirements and recommendations. In addition, the update should not attempt to minimize impacts by implying the impact is in the millions instead of billions (4330 million = 4.33 billion).

Fishery Management Plan

Given Item No. 5 above, the GEIS should review the Fishery Management Plans for target species to insure the most recent information is utilized in the EFH assessments. The Division recommends review and inclusion of data from the websites of the various fishery management commissions and councils and the National Marine Fisheries Service (NMFS) website (<http://www.nefsc.noaa.gov/nefsc/habita/efh/#list>) along with the results of the presently on-going impingement/ entrainment studies.

QQ-4

Radiation Protection and Release Prevention Element

The NJDEP's Radiation and Release Prevention Element's (RPRP) review of the GEIS has resulted in the following comments and concerns that are directed to specific impact areas.

Plant and the Environment, Bay anchovy (Page 2-35)

QQ-5

Bay anchovies are one of the most abundant species in Barnegat Bay and are ecologically important in that they serve as a food source for fish. There are no recent population trends for bay anchovies so the impact of Oyster Creek on this ecologically important species cannot be addressed.

Plant and the Environment, Blue Crab (Page 2-44)

QQ-6

Table 2-3 notation says that blue crab are a species known to be affected by the operations of the OCNGS, yet the text says blue crab are at sufficient numbers and 1995 was the largest harvest recorded since 1950. Can you clarify these statements? Are blue crabs impacted by the OCNGS and if so, to what degree?

Plant and the Environment, Dramatic decrease in hard clams (Page 2-45)

QQ-7

What is the number and location of hard clam beds in Barnegat Bay?

Plant and the Environment, Submerged aquatic vegetation (Page 2-47)

QQ-8

Eelgrass represents the most important submerged aquatic vegetation. How will the next dredging of Oyster Creek impact the eelgrass beds and what will be done to minimize the impact? What is the current assessment of the eelgrass beds?

Environmental Impacts of Operation, Entrainment of Phytoplankton and Zooplankton (Page 4-7)

QQ-9

"Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term".

The Draft SEIS fails to mention that the OCNGS has been conducting an entrainment study which began in September 2005. However, this study has not been concluded and the assessment of data has not been completed, therefore how can the statement of "no problem" be made? This issue will be further evaluated through the Department's NJPDES process.

**Clarification on the following previously submitted comment (changes are in bold and strike out under CREST).
Plant and the Environment, Radiological Impacts (Page 2-75)**

Following is a clarification of the Department's Environmental Sampling and Monitoring Program (ESMP). Data are collected not only beyond the owner controlled area, but at various locations onsite:

- Groundwater sampling is done within the OCNGS site boundary. Tap water is sampled from the OCNGS site Administration Building
- Direction radiation measurements using Thermoluminescent Dosimeters are taken at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage facility.
- Continuous Radiological Environmental Surveillance Telemetry – Three **pressurized** ion chamber devices (CREST monitors) measure direct radiation at the Independent Spent Fuel Storage Facility.

Environmental Justice

The NJDEP's Environmental Justice Program (EJ) review resulted in the following comments.

Section 4.4.6 - Environmental Justice

The NRC staff used data from the 1990 Census to evaluate low-income populations, and data from the 2000 Census to evaluate minority populations within a 50 mile radius from the facility. The EJ Program questions the use of 1990 data to evaluate low-income populations given the fact that 2000 data are available.

The GEIS did not take into consideration the projected explosive population growth and changing demographics in this area of New Jersey in their evaluation of potential adverse impacts on low-income and minority communities for the next 20 years of operation.

The NRC staff concluded that "it found no unusual resource dependencies or practices such as subsistence agriculture, hunting or fishing that would be impacted by OCNGS license renewal." Again, given the time constraint associated with this review, it was difficult to confirm this statement. However, the EJ Program has knowledge that in many areas within the 50 mile-radius evaluated in the EIS, low-income and minority communities are engaged, to a certain extent, in subsistence fishing and farming. So, the pathways through which the environmental impacts associated with OCNGS license renewal can affect human populations need to be reevaluated.

QQ-10

QQ-11

Section 8 – Alternatives

The above comments also apply to this section.

Thank you for giving the NJDEP the opportunity to provide these comments on the document.

Sincerely,

Kenneth C. Koschek
Supervising Environmental Specialist
Office of Permit Coordination and
Environmental Review

C: Susan Rosenwinkel, NJDEP
Karen Tuccillo, NJDEP
Donald Wilkinson, NJDEP
Andy Heyl, NJDEP

QQ-12

From: Walter Lenskold [lenskoldw@hotmail.com]
Sent: Wednesday, September 13, 2006 4:11 PM
To: OysterCreekEIS@nrc.gov
Subject: Do not relicense Oyster Creek

There is too much risk associated with a nuclear plant so close to so many people. There is time, if you get moving, to switch over to wind turbine power and solar power before the current license expires. God help us all if you don't listen and act properly.

Walter & Lorraine Lenskold
Toms River, NJ

RR-1



Radiation and Public Health Project

Joseph J. Mangano, MPH, MBA, National Coordinator
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Directors
Jane S. Gould
Ernest J. Sternglass, PhD
David Friedson
Scott Cullen, JD
William McDonnell
Joseph Mangano

*6/14/06
71 FR 34969*

Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration, Mailstop T-6D 59
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

July 14, 2006

①

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RULES AND DIRECTIVES
BRANCH

Dear Sir/Madam:

Please accept the following comments, and consider them when preparing the Supplemental Environmental Impact Statement regarding the proposed license renewal of the Oyster Creek Nuclear Generating Station.

I direct the Radiation and Public Health Project (RPHP) research group, which specializes in the study of health risks posed by nuclear weapons and reactors. Our members, who are scientists and health professionals, have published 22 medical journal articles and written 5 books on the topic since 1994.

SS-1

I and my colleagues find the recent Generic Environmental Impact Statement for Oyster Creek to be deficient in assessing health risk of extending the reactor's license for 20 years. The assumption that environmental releases of radioactivity do not pose a health risk because amounts are below federally permitted levels is presumptive, and does not constitute sound public health policy. Actual/historical effects of environmental releases should be thoroughly studied and the public informed of any potential or actual health risk before the license extension is considered.

SS-2

The assumption that low dose radiation exposure was harmless has been contradicted for several types of exposure:

- Pelvic X-rays to pregnant women were performed regularly until studies (starting with Dr. Alice Stewart's work in the 1950s) showed that such exposures raised risk of cancer to the fetus during childhood.
- A 1997 National Cancer Institute study estimating as many as 212,000 Americans developed thyroid cancer from exposure to radioactive iodine was the first admission by the federal government that bomb tests had harmed Americans.

Advisory Board
Rosalie Bertell, PhD, GNSH
Samuel S. Epstein, MD
John Gofman, MD, PhD

Research Associates
William Reid, MD
Agnes Reynolds, RN
Janette Sherman, MD
Susanne Saltzman, MD

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*E-RIS = ADM-03
Call = M. Masnik (MTH2)*

- In a 2000 report, the U.S. Energy Department made its first admission that occupational exposures to nuclear weapons facility workers resulted in elevated cancer risk.

SS-2
(contd)

In the case of Oyster Creek, there is considerable data to suggest that emissions from the plant have entered the environment and human bodies, and are a potential co-factor in local cancer rates.

SS-3

1. Emissions. Oyster Creek has historically released much higher levels of environmental radioactivity compared to other U.S. nuclear reactors. From 1970 to 1993, it emitted a total of 77 curies of Iodine-131 and particulates into the air, the highest of any U.S. reactor. (Data from Radioactive Materials Released from Nuclear Power Plants, annual report 1993. NUREG/CR-2907).

In 2003, the last year for which data is available, Oyster Creek ranked high among U.S. reactors for the following isotopes (data are taken from the NRC Radiation Exposure Information and Reporting System on effluents, available at www.reirs.com/effluent/EDB_rptLicenseeReleaseAmtsQuery.asp, and expressed in total microcuries:

Strontium-90	62.3	1 st highest
Strontium-89	6233	2 nd highest
Barium-140	8672	2 nd highest
Iodine-131	10770	9 th highest
Krypton-85m	21100000	4 th highest
Krypton-87	81900000	2 nd highest

2. Environmental Radioactivity. Levels of environmental radioactivity near Oyster Creek are much higher than in areas far from nuclear plants (i.e., Waretown, one mile from the plant, vs. Trenton, 50 miles distant). The information is taken from annual measurements in drinking water from 1984-2003 from the U.S. Environmental Protection Agency program known as Environmental Radiation Ambient Monitoring System (<http://oaspub.epa.gov/enviro/erams>), and expressed in average picocuries per liter.

SS-4

Strontium-90	Waretown .0553	Trenton .0264
Gross Alpha	Waretown .925	Trenton .088
Gross Beta	Waretown 2.015	Trenton 1.523

Thus, gross alpha levels are more than ten times higher in Waretown, Strontium-90 is more than two times higher, and gross beta is 32% higher.

3. In-Body Radioactivity. Since 1998, RPHP has conducted a study of Strontium-90 in baby teeth, the only study of in-body levels near U.S. nuclear plants. The study, which is patterned after a similar study of bomb test fallout by Washington

SS-5

Appendix A

SS-5
(contd)

University in the 1960s, has tested nearly 5,000 teeth for concentrations of this isotope. Five peer-reviewed medical journal articles have been published on study findings, giving the study recognition from the scientific community.

In New Jersey, over 600 teeth have been tested, many from Ocean and Monmouth Counties, which are closest to and downwind from Oyster Creek. From 1986-89 to 1994-97, the average picocuries of Sr-90 per gram of calcium in teeth at birth rose nearly 50% in recent years:

Births from 1986-89 2.51 pCi/g Ca (n=44)
Births from 1994-97 3.76 pCi/g Ca (n=31)

This finding, which duplicates that found near six other U.S. reactors, nullifies the contention of some critics that all Sr-90 in teeth are from bomb tests of the 1950s and the 1960s. Discussion of other sources of Sr-90 and why it is likely that much of the Sr-90 represents ongoing emissions from nuclear plants can be found in Mangano JJ et al. An unexpected rise in strontium-90 in US deciduous teeth in the 1990s. *The Science of the Total Environment* 2003;317:37-51.

SS-6

4. **Local Cancer Rates.** Infants and children are especially susceptible to the harmful effects of radiation. In 2003, the U.S. Environmental Protection Agency published a report estimating that exposures to persons under age two are 10 times as harmful as similar exposures to adults.

According to the New Jersey cancer registry, Ocean and Monmouth Counties have a rate of cancer diagnosed in children under age ten in 1981-2000 that is 24% higher than the U.S. rate (significant at $p < .001$). A total of 523 local children were diagnosed over the two decades. U.S. data is from the SEER data base of nine U.S. states and cities.

	Cases 0-9	Pop. 0-9	Cases/100,000
Monmouth/Ocean	523	2,720,723	19.22
U.S.			15.50

In addition, the rate of cancer deaths among Monmouth and Ocean County children age 0-9 has steadily risen in the past two decades, while state and national rates have fallen. Data are from the National Center for Health Statistics, available at <http://wonder.cdc.gov>, underlying cause of death.

5 Year Period	Deaths 0-9	Avg.Pop 0-9	Deaths/100,000
1980-84	21	114,346	3.67
1985-89	26	126,415	4.11
1990-94	29	141,374	4.10
1995-99	34	153,988	4.42

Change 1980-84 to 1995-99	
Monmouth, Ocean counties	+20.2%
New Jersey	- 22.9%
U.S.	- 35.4%

SS-6
(contd)

While these four areas are presented separately here, RPHP has examined potential links between Oyster Creek radioactivity and cancer. In our most recent journal article, we found that trends in average Sr-90 in baby teeth Monmouth and Ocean county children were followed by similar trends in cancer incidence rates age 0-9 in the two counties, with a five-year latency. Findings were duplicated near the Brookhaven and Indian Point nuclear facilities in New York. Thus, RPHP has found a statistical link between Sr-90 in local teeth and cancer risk. More work needs to be done, but this evidence should be taken seriously. (Data published in Mangano JJ. A short latency between radiation exposure from nuclear plants and cancer in young children. *International Journal of Health Services* 2006;36(1):113-35).

SS-7

In conclusion, I and my colleagues urge the NRC to thoroughly examine potential health risks from Oyster Creek using available data – rather than just presuming that permissible doses are safe – before making a decision on the 20 year license extension for Oyster Creek.

SS-8

Sincerely yours,



Joseph Mangano, MPH MBA
National Coordinator

6/16/06
71FR 34969

September 4, 2006

Chief, Rules + Directives Branch
U.S. Nuclear Regulatory Comm.

15

Dear Chief

Regarding Relicensing the OYSTER CREEK NUCLEAR PLANT

Please DO NOT relicense this 35 year old plant which is the oldest in the country (with still 5 years to go) so much technology for safer cleaner energy alternatives are now available and during the next 5 years MORE will be. Just think what a dinosaur this plant will be by 2031 if it gets relicensed.

9/11 should be a wake up call of what can happen by terrorist when they crashed 2 planes into two buildings. Think of the death and destruction of a NUCLEAR PLANT attacked. You can be sure these terrorist aren't going to listen to our security plans telling them to get out of the restricted area.

PLEASE THINK SAFE DON'T Relicence THE OYSTER CREEK NUCLEAR PLANT

Sincerely Yours
Mary Mayza

3238 Osborn Terrace
Toms River, NJ 08753
732-270-2678

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w. massnik (MTR2)

Sept 14, 2006

Chief of Rules - Directores Branch
 Division of Administration
 Moulthrop T-60 59
 US NUCLEAR REGULATORY Commission
 Washington, DC, 20555-0001

4/16/06
 71FR34969

22

Dear Chief

Last week I wrote you a letter asking you NOT to relicense the 35-year old (New Jersey) OYSTER CREEK NUCLEAR PLANT. So much change for clean safe energy has been made since this plant was built and so much more will be available in the near future. Such as the article enclosed of a company named GEOPLASMA in Atlanta build a plant in Florida to VAPORIZE TRASH. SYNTHETIC COMBUSTIBLE gas produced will be used to run turbines to create electricity. Sludge from waste water will be hauled into the area and slag for road construction. Please read the attached article.

UU-1

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Sincerely yours
 Mary Maryza

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 TOMS RIVER, NJ 08753

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In this plan, Fla. garbage is toast

\$425M Sunshine State plant would vaporize 3,000 tons of trash and create electricity

BY BRIAN SKOLOFF
ASSOCIATED PRESS

FORT PIERCE, Fla. — A Florida county has grand plans to ditch its dump, generate electricity and help build roads — all by vaporizing garbage at temperatures hotter than the sun.

The \$425 million facility expected to be built in St. Lucie County will use lightning-like plasma arcs to turn trash into gas and rock-like material. It will be the first such plant in the nation operating on such a massive scale and the largest in the world.

Supporters say the process is cleaner than traditional trash incineration, though skeptics question whether the technology can meet the lofty expectations.

The 100,000-square-foot plant, slated to be operational in two years, is expected to vaporize 3,000 tons of garbage a day. County officials estimate their entire landfill — 4.3 million tons of trash collected since 1978 — will be gone in 18 years.

No byproduct will go unused, according to Geoplasma, the Atlanta-based company building and paying for the plant.

Synthetic, combustible gas produced in the process will be used to run turbines to create electricity — about 120 megawatts a day — that will be sold back to the grid. The facility will operate on about a third of the power it generates, free from outside electricity.

About 80,000 pounds of steam per day will be sold to a neighboring Tropicana Products Inc. facility to power the juice plant's turbines.

Sludge from the county's wastewater treatment plant will be vaporized, and a material created from melted organic matter — up to 800 tons a day — will be hardened into slag, and sold for use in road and construction projects.

"This is sustainability in its truest and finest form," said Hilburn Hillestad, president of Geoplasma, a subsidiary of Jacoby Development Inc.

For years, some waste-management facilities have been converting methane — created by rotting trash in landfills — to power. Others also burn trash to produce electricity.

But experts say population growth will limit space available for future landfills.

"We've only got the size of the planet," said Richard Tedder, program administrator for the Florida Department of Environmental Protection's solid waste division. "Because of all of the pressures of development, people don't want landfills. It's going to be harder and harder to site new landfills, and it's going to be harder for existing landfills to continue to expand."

The plasma-arc gasification facility in St. Lucie County, on central Florida's Atlantic Coast, aims to solve that problem by eliminating the need for a landfill. Only two similar facilities are operating in the world — both in Japan — but are gasifying garbage on a much smaller scale.

Up to eight plasma arc-equipped cupolas will vaporize trash year-round, nonstop. Garbage will be brought in on conveyor belts and dumped into the cylindrical cupolas where it falls into a zone of heat more than 10,000 degrees Fahrenheit.

"We didn't want to do it like everybody else," said Leo Cordeiro, the county's solid waste director. "We knew there were better ways."

No emissions are released during the closed-loop gasification, Geoplasma says. The only emissions will come from the synthetic gas-powered turbines that create electricity. Even that will be cleaner than burning coal or natural gas, experts say.

Few other toxins will be generated, if any at all, Geoplasma says.

But critics disagree. "We've found projects similar to this being misrepresented all over the country," said Monica Wilson of the Global Alliance for Incinerator Alternatives.

Wilson said there aren't enough studies yet to prove the company's claims that emissions will likely be less than from a standard natural-gas power plant.

"I think this is the time for the residents of this county to start



LYNNE SLADKY/ASSOCIATED PRESS

Leo Cordeiro, left, St. Lucie County solid waste director, and assistant director Ron Roberts stand at the landfill in Fort Pierce, Fla.

asking some tough questions," Wilson said.

Bruce Parker, president and CEO of the Washington, D.C.-based National Solid Wastes Management Association, scoffs at the notion that plasma technology will eliminate the need for landfills.

"We do know that plasma arc is a legitimate technology, but let's see first how this thing works for St. Lucie County," Parker said. "It's too soon for people to make wild claims that we won't need landfills."

Louis Circeo, director of Georgia Tech's plasma research division, said that as energy prices soar and landfill fees increase, plasma-arc technology will become more affordable.

"Municipal solid waste is perhaps the largest renewable energy

resource crisis."

He said that if large plasma facilities were put to use nationwide to vaporize trash, they could theoretically generate electricity equivalent to about 25 nuclear plants.

NEWARK, N.J.
STAY LEDGER
week of
9-10-06 ?

resource that is available to us," Circeo said, adding that the process "could not only solve the garbage and landfill problems in the United States and elsewhere, but it could significantly alleviate the cur-

From: <DMcKeon@co.ocean.nj.us>
 To: <oystercreekeis@nrc.gov>
 Date: 09/01/2006 3:49:01 PM
 Subject: Oyster Crek EIS - Question on Strontium-90 emmissions

6/16/06
 71FR34969

(7)

As a follow-up to an earlier conversation with Michael Masnik:

I have attached a chart that was provided to me by a resident of Ocean County. The chart notes that Oyster Creek had the second highest emission of Strontium-90 of twenty nuclear plants surveyed, from 2001 to 2003. The source listed is the NRC, but the web page listed at the bottom of the chart is not accessible. Please comment on this information, as it appears to be inconsistent with information contained within the draft Environmental Impact Statement for Oyster Creek.

(See attached file: Nuclear Emissions.pdf)

David J. McKeon, Planning Director
 Ocean County Planning Department
 129 Hooper Avenue
 P.O. Box 2191
 Toms River, New Jersey 08754-2191
 web address - www.planning.co.ocean.nj.us
 Ph.: 732-929-2054
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CC: <AAvery@co.ocean.nj.us>, <TAGliata@co.ocean.nj.us>

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 template = ADH-03

ERIDS = ADH-03
 Call = M. Masnik (MTL)

Appendix A

U.S. NUCLEAR REACTORS WITH HIGHEST LEVELS OF AIRBORNE
EMISSIONS OF RADIOACTIVE STRONTIUM-90, 2001-2003
(in Microcuries, one-millionth of a curie)

<u>Reactor (state)</u>	<u>Sr-90</u>
1. Fitzpatrick (NY)	661.2
2. Oyster Creek (NJ)	593.2
3. Quad Cities 1 (IL)	93.5
4. LaSalle 1 (IL)	49.3
5. Salem 1 (NJ)	42.7
6. Susquehanna 1 (PA)	29.5
7. Dresden 2 (IL)	14.6
8. Brunswick 1 (NC)	9.3
9. Washington Nuclear (WA)	6.8
10. Duane Arnold (IA)	5.4
11. Cooper Station (NE)	5.2
12. Fermi 2 (MI)	4.2
13. Kewaunee 1 (WI)	3.4
14. Pilgrim (MA)	3.3
15. St. Lucie 1 (FL)	3.2
16. St. Lucie 2 (FL)	3.0
17. Big Rock Point (MI)	2.2
18. Monticello 1 (MN)	2.0
19. Clinton (IL)	1.9
20. Hatch 1 (GA)	1.9

Source: U.S. Nuclear Regulatory Commission, available at
www.nrc.gov/effluent/EDB_rptLicenseReleaseAmtsQuery.asp



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue – Room 142
Boston, Massachusetts 02210-3334



August 30, 2006

9043.1
ER 06/588

Michael Lesar, Chief
Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, D.C. 20555-0001

Dear Mr. Lesar:

The U.S. Department of the Interior (Department) has reviewed the Draft Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants (NUREG-1437, Supplement 28) regarding Oyster Creek Nuclear Generating Station. The Department's U.S. Fish and Wildlife Service (Service) commented in response to the Nuclear Regulatory Commission's Notice of Intent to prepare an Environmental Impact Statement for the proposed project in a letter dated November 23, 2005. The comment letter has been incorporated into the subject document in its entirety in Appendix E (pp. E-22 through E-31). Specific passages in the Comments section (Appendix A) are referenced by Commenter Identifier, OS-AJ.

We have no further comments on the GEIS. If you have additional questions regarding this matter, please contact the Service's New Jersey Field Office, Environmental Contaminants Specialist, Clay Stern at (609) 646-9310, extension 27.

Thank you for the opportunity to review and comment on this project. Please contact me at (617) 223-8565 if I can be of assistance.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

WW-1

Appendix A

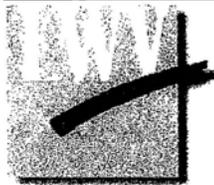
From: Dotty Reynolds [mailto:ddreynolds@all2ez.net]
Sent: Wednesday, July 05, 2006 3:57 PM
To: OysterCreekEIS@nrc.gov
Subject: U.S.Nuclear Regulatory Commission Hearing
Importance: High

COMMENTS FOR OYSTER CREEK NUCLEAR PLANT PUBLIC HEARINGS, JULY 12, 2006

- XX-1 No one expected a tsunami wave to sweep across Indonesia, leaving a swath of death and destruction. No one thought a category 5 hurricane would strike the Gulf coast, causing levees to collapse in New Orleans. No one believed terrorists could fly into the world trade center, collapsing the twin towers and killing almost 3,000 people. No one expects a nuclear accident of catastrophic proportions at Oyster Creek, but should we trust the oldest nuclear plant in the U.S. to operate safely for another 20 years?
- XX-2 It is imperative that all safety factors and concerns be examined.
XX-3 How can the NRC be allowed to ignore issues which the State of New Jersey considers
XX-4 important? The steel drywell liner, the barrier preventing the release of radiation during a reactor accident, needs close scrutiny. Why are tests not being done now to measure the thickness of the drywell liner, despite previous evidence of corrosion? Should we risk a terrorist attack at the site of a nuclear plant with on-site storage of spent nuclear fuel? In the event of an accident, the evacuation route is unworkable for much of the area, including all of Long Beach Island.
- XX-5 We do know that millions of small fish, shrimp and other aquatic animals are currently being killed due to the fact that the plant has no water cooling towers. Cooling towers are a necessity to prevent these losses of marine life which are trapped against water intake screens, or drawn into the plant, or killed by the change in water temperature in the bay. Restoring wetlands is not a reasonable alternative.
- XX-6 The NRC may do doing an extensive in depth review, but unless all concerns are considered objectively, the results will be flawed. If the nuclear plant is deemed necessary for power, then a new plant as planned in the 70's, should replace the current obsolete plant with one in the new safer design.
- XX-7 In spite of the best maintenance and replacement of parts, the older our car, the greater the likelihood our car will break down. If we want to ensure that we will get to work every day, safely, we routinely replace our car with a new one. How long would we continue to drive a car, or should we operate a nuclear plant, which could break down with dire consequences?
- XX-8 The decision regarding license renewal could mean life or death for thousands; the potential health, safety and economic impacts on New Jersey are enormous. Congressman Jim Saxton,

in support of requests by many elected officials and citizen groups, has introduced H.R. 966, a bill that would require an independent assessment of safety and security issues by the National Academy of Sciences Research Council. It is imperative that the Academy of Sciences determine that Oyster Creek nuclear plant is safe, secure and necessary, prior to NRC relicensing approval, or Oyster Creek must be shut down.

XX-8
(contd)



**LEAGUE OF WOMEN VOTERS
OF OCEAN COUNTY, NJ**

September 4, 2006

The League of Women Voters submits the following comments on the (NRC) Nuclear Regulatory Commission's Draft Generic Environmental Impact Study (GEIS) for the Re-Licensing of Oyster Creek Nuclear Generating Station:

I. The use of 1970 data to analyze the cumulative effect of Oyster Creek operations on Barnegat Bay:

YY-1

At the July 12, 2006 public hearing Professor Michael Kennish, a research professor at Rutgers University and an acknowledged authority on the ecology of Barnegat Bay, pointed out that no recent data on the cumulative effect by Oyster Creek on Barnegat Bay had been provided to the NRC. He also emphasized that the studies used by the NRC to evaluate the current situation were at least 30 years old, and though they were relevant at that time, they no longer gave a reasonable basis on which to assess the current status of Barnegat Bay. The League is deeply concerned not only about the lack of relevant viable data, but about the NRC's lack of insistence on obtaining this critical information.

YY-2

It was also pointed out at this same hearing that the maps used in the draft report to identify the Oyster Creek and Forked River had inaccuracies relating to the designations of the Oyster Creek and the South Branch of Forked River waterways.

YY-3

Please provide the League with the NRC's reasons behind the decisions to use the obsolete 1970 data and the use of inaccurate maps. We would like your thoughts on how results based on incorrect information can be anything but incorrect.

YY-4

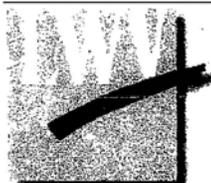
2. The failure to analyze the effects of a nuclear accident or terrorist attack at Oyster Creek:

YY-5

Failure to perform an in-depth study on the environmental impact of a severe accident when considering the risk in operating an aged nuclear plant with documented problems of corrosion of its drywell, the containment barrier necessary for protection of the public from the effects of radiological releases, for another 20 or more years is unacceptable.

The presumption that a terrorist attack and subsequent fuel pool fire would not affect the environment in a critical way is in contradiction to the warnings from scientists, many government agencies and the National Academy of Sciences.

3. The NRC's reliance on AmerGen for data that constitutes the substance of its draft report:



**LEAGUE OF WOMEN VOTERS
OF OCEAN COUNTY, NJ**

League of Women Voters
September 4, 2006

Comments on NRC's GEIS
Page 2

It has been documented by citizens and verified by NRC Engineers, that AmerGen has used flawed data for 10 years in estimating the status of a critical safety component, namely, the drywell liner. Further, its owner Exelon had not provided information to the NRC about its ten-year leak of tritium at its plant in Illinois.

YY-6

4. Protection of drinking water in Ocean County, NJ:

The health and safety of the ecologically delicate Cohansey and Kirkland aquifers for present and future generations demand that a more viable and in-depth study of the extent of the "intrusion" of radionuclides into these aquifers be undertaken and documented as a part of this report and for the public record.

YY-7

5. Cooling Towers:

The League supports the recommendation by the NJ Department of Environmental Protection that natural draft cooling towers should be installed at Oyster Creek. The NRC's acceptance of AmerGen's system using mechanical draft cooling towers, which consume more energy, is an incorrect response to an important problem.

YY-8

In conclusion, the League of Women Voters looks forward to receiving the responses from the Nuclear Regulatory Commission to each of the above comments and calls for the NRC to conduct a public hearing before the final report is issued.

Respectfully submitted,

Joan K. Rubin

Gail Marsh Saxer

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THREATS AND CAPABILITIES
CHAIRMAN
PROJECTION FORCES
MILITARY PERSONNEL

U.S. House of Representatives

Washington, DC 20515

August 9, 2006

Dr. Nils J. Diaz, Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Dr. Diaz:

I send this letter as my official comment regarding the Draft Environmental Impact Statement (DEIS) issued as part of the operating license renewal process for the Oyster Creek Nuclear Generating Facility in Forked River, New Jersey.

The recent DEIS, issued by the Nuclear Regulatory Commission, states there are no environmental impacts that would preclude renewing the operating license extension of Oyster Creek. According to the report, the Commission has determined that the adverse environmental impacts of license renewal would not prevent energy planning decision makers from granting the operating extension.

As I understand it, the NRC conducted a thorough analysis to reach this determination. However, I am concerned the environmental impacts of a potential atmospheric release of radiation have not been adequately addressed in this report. In 2005, the National Academy of Sciences (NAS) released a report evaluating the potential risks of boiling water reactor (BWR) plants with above ground spent fuel pools. The report, entitled Safety and Security of Commercial Spent Fuel Storage, found the potential vulnerabilities of BWR pools are plant-design specific, and recommended that,

"The Nuclear Regulatory Commission should undertake additional best-estimate analyses to more fully understand the vulnerabilities and consequences of loss-of-pool coolant events that could lead to a zirconium cladding fire."

Although the DEIS contains a specific section regarding Severe Accident Mitigation, I inquire as to whether or not the NAS suggested analysis was incorporated into the statement? We must not underestimate the catastrophic impacts to our environment in the event a cooling pool is compromised.

I have long supported the involvement of an independent and unbiased third party, such as the NAS, in the license renewal process of Oyster Creek. Additionally, I support the inclusion of their suggested analysis in the Final Environmental Impact Statement (FEIS), and urge the NRC to make every effort to do so.

Thank you for your continued commitment to this important matter.

Sincerely,

Jim Saxton
Member of Congress

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THIS STATIONERY PRINTED ON PAPER MADE OF RECYCLED FIBERS

ZZ-1

September 6, 2006

Chief, Rules and Directives Branch
Division of Administrative Services
Mailstop T-6D59
US Nuclear Regulatory Commission
Washington D.C., 20555

Attention: Comment on Generic Environmental Impact Statement (GEIS) for the Oyster Creek Nuclear Generating Station (OCNGS)

Dear Sir:

As was brought to your attention in our letter to you dated November 15, 2005, the Barnegat Bay National Estuary Program (BBNEP) is the principal steward of the natural resources of the Barnegat Bay/Little Egg Harbor estuary. It is composed of federal, state, county, municipal, academic, business, and citizen organizations committed to restore, maintain, protect, and enhance this "estuary of national significance".

The BBNEP is herein submitting comment on the Nuclear Regulatory Commission's (NRC) draft supplement to the Generic Environmental Impact Statement (GEIS) for the Oyster Creek Nuclear Generating Station (OCNGS). The GEIS contained misconstrued information based on an extensive review of published information (academic journals or other sources) that led to a finding by NRC staff of no significant impacts on aquatic populations in the bay by the OCNGS. In fact, this is not the case.

This information (found on pages 4-15, 4-21, and 4-51 of the GEIS), contains citations from Kennish, M. J. 2001. State of the Estuary and Watershed: An Overview. *Journal of Coastal Research*, Special Issue 32, pp. 243-273. **The information from the aforementioned publication, does conclude that there is no significant impact of the OCNGS on Barnegat Bay aquatic populations, however it is specifically referring to the results of impingement, entrainment, and thermal discharge effects determined for the 1975-1977 period, the only period when impingement and entrainment data were collected concurrently with data population surveys in the bay.**

Dr. Kennish contested the use of these quotes from (pages 4-15, 4-21, and 4-51 of the GEIS) at the public hearing for the GEIS held on Wednesday, July 12, 2006, in Toms River, New Jersey. Therefore, the GEIS has based its conclusions on significantly out-of-date and out-of-context information, rendering their conclusions on OCNGS's impacts on the aquatic populations of Barnegat Bay irrelevant.

AAA-1

During the past 35 years of OCNGS operation, significant concerns have existed regarding impingement, entrainment, and thermal impacts on estuarine and marine life. As a result, the Science and Technical Advisory Committee (STAC) of the BBNEP convened a meeting on November 1, 2005, and developed the following recommendations for the NRC regarding the OCNGS.

- An independent, scientific body (similar to the National Academy of Science) must be assembled to coordinate and oversee surveys and studies on the impacts of the OCNGS on the Barnegat Bay/Little Egg Harbor estuary.
- There have been very few peer-reviewed studies during the past 30 years of the impact of OCNGS on the population of aquatic communities in central Barnegat Bay. Additional studies *must* be conducted in the Barnegat Bay/Little Egg Harbor to accurately assess these impacts and they *must* be done concurrently with entrainment and impingement studies.
- The NRC *must* require the OCNGS to focus on remediation of its *direct* impacts on estuarine and marine organisms in the Barnegat Bay/Little Egg Harbor estuary.
- The use of wetlands restoration as a mitigation measure *must not* be implemented in place of remediation efforts targeting bay populations and communities of organisms.

The BBNEP recommends strongly that the renewal permit include a condition that charges the BBNEP with the role of the independent scientific body whose purpose is to coordinate research efforts in the Barnegat Bay relating to the effects of the OCNGS. The BBNEP's Comprehensive Conservation and Management Plan (CCMP) recognizes the need for such an entity. Action Item 5.15 of the CCMP charges the BBNEP with establishing this technical group for the examination and coordination of data in order to understand OCNGS's role in the overall ecological health of the bay.

Program partners agree that the BBNEP can and should have the lead role in coordinating and overseeing much-needed surveys and studies regarding OCNGS's effects on the Barnegat Bay ecosystem.

In conclusion, the position of the BBNEP is that regardless of the option pursued by the NRC regarding Oyster Creek's license renewal, without question, the OCNGS absolutely must be required to conduct detailed, comprehensive studies of the communities of bay organisms to determine what the overall impact of the power plant is on Barnegat Bay.

BARNEGAT NATIONAL ESTUARY PROGRAM

Bob Scro, Director

RUTGERS UNIVERSITY, INSTITUTE OF MARINE
AND COASTAL SCIENCES, JACQUES COUSTEAU
NATIONAL ESTUARINE RESEARCH RESERVE



Michael DeLuca
Co-Chair, STAC

cc: Michael Masnik, Senior Project Manager, NRC
Congressman James Saxton
BBNEP Policy Committee Members:
 Lisa P. Jackson, NJ DEP Commissioner
 Tom Fote, Citizen Liaison to the BBNEP
 The Hon. David Siddons, Island Heights Mayor
 Allen J. Steinberg, USEPA Region II Administrator
 Joseph Vicari, Ocean County Freeholder

RUTGERS ENVIRONMENTAL LAW CLINIC

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September 8, 2006

VIA EMAIL AND U.S. MAIL

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, D.C. 20555-0001
OysterCreekEIS@nrc.gov

Re: NUREG-1437: Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28, Regarding Oyster Creek Nuclear Generating Station Draft Report for Comment: Comments on Safety and Security Aspects

Please accept these written comments submitted on behalf of Nuclear Information and Resource Service, Jersey Shore Nuclear Watch, Inc., Grandmothers, Mothers and More for Energy Safety, New Jersey Public Interest Research Group, New Jersey Sierra Club, and New Jersey Environmental Federation (collectively "Citizens") on the safety and security aspects of the above-referenced Draft Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants, Supplement 28, regarding Oyster Creek Nuclear Power Plant ("DSEIS"). Comments on other aspects of the DSEIS are being submitted under separate cover by Julia Huff of this office for Citizens and additional organizations. NRC should consider and respond to both sets of comments, as they are complementary and not duplicative.

I. Summary

The DSEIS is inadequate because it fails to consider the environmental effects of a spent fuel pool fire that could be caused by accident or by an act of terrorism. This failure, among others, means

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* Admitted in New Jersey Pursuant to 1:21-3(c) + Also admitted in New York # Also admitted in Pennsylvania

BBB-1

RUTGERS ENVIRONMENTAL LAW CLINIC

that the analysis of Severe Accident Mitigation Alternatives (“SAMA”) is woefully inadequate.

Calculations by experts show that a spent fuel pool fire could result from the packing of the spent fuel into the pool at high density, which was not originally intended. Such a fire could directly cause \$180 billion and \$1.8 trillion worth of damage, including over 24,000 lung cancers. This is around ten times the amount of damage caused by hurricane Katrina. At an estimated probability of around 1 in 10,000 per year, this imposes a risk to society that is valued at between \$200 million and \$3.6 billion.

AmerGen stands to make around \$2.6 billion during the proposed 20 year extended operating period, provided nothing serious goes wrong with the plant during that time. Thus, the costs to society of the risk imposed by Oyster Creek are probably more than AmerGen would make from the electricity generated at the plant, even it operated at full capacity throughout the proposed 20 year extended license period.

This means that even closure of the plant would be a cost effective SAMA. Further, according to experts, transferring the spent fuel that is over five years old to dry cask storage would significantly lower the chance of a spent fuel pool fire at a cost of less than \$100 million. Indeed, AmerGen has quoted the cost as around \$30 million, and, incredibly, has described this as an “unnecessary expense.” The failure of the DSEIS to consider the possibility of a spent fuel pool fire means that it currently violates the requirements of both the National Environmental Policy Act (“NEPA”), and the NRC regulations that implement NEPA. Thus, the SAMA analysis must be completely revised and presented as a new draft for additional public comment.

In addition, allowing Oyster Creek to continue to operate its spent fuel pool in such a reckless manner during any additional period of licensed operation would violate the Atomic Energy Act (“AEA”). Moreover, there are currently no acceptable means of containing the wastes that would be generated by further operation of the reactor. Therefore, the NRC should refuse to relicense the reactor,

RUTGERS ENVIRONMENTAL LAW CLINIC

BBB-1
(contd)

because to do so would be “inimical to the common defense and security or to the health and safety of the public.” 42 U.S.C. § 2133(d). Furthermore, because allowing AmerGen to continue to operate a high density fuel pool does not offer “adequate protection” to public health and safety, as required by the AEA, NRC should also take urgent action to mitigate the current risk caused by the spent fuel pool at Oyster Creek. Although Citizens do not think that the Oyster Creek site is an appropriate place for the long term disposal of high level nuclear waste, the extreme imminent risk posed by the existing spent fuel pool means that Citizens are forced to accept an expedient, imperfect, and temporary solution to lower the risk. Thus, NRC should order AmerGen to transfer all spent fuel that is over five years old to the dry cask storage facility and to maintain sufficient spacing in the pool to minimize the risk of a spent fuel pool fire. The DSEIS must assess the consequences this action. In particular, the DSEIS must assess the vulnerability of the dry cask storage systems to terrorist attack and the potential for environmental release of radioactive waste, and provide methods to mitigate these risks. Furthermore, if NRC wishes to proceed with relicensing, it must also complete the evaluation of the site specific consequences of adding yet more fuel to the dry cask store over the next twenty years.

BBB-2

BBB-3

II. Requirements of NEPA

BBB-4

The National Environmental Policy Act (“NEPA”) establishes a “national policy [to] encourage productive and enjoyable harmony between man and his environment,” and was intended to reduce or eliminate environmental damage and to promote “the understanding of the ecological systems and natural resources important to” the United States. *Dept. of Transp. v. Pub Citizen*, 541 U.S. 752, 756 (2004) (quoting 42 U.S.C. § 4321). The application of NEPA’s requirements, under the rule of reason relied on by the NRC, is to be considered in light of the two purposes of the statute: first, ensuring that the agency will have and will consider detailed information concerning significant environmental impacts; and second, ensuring that the public can both contribute to the body of information and can

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access the information that is made public. *San Luis Obispo Mothers For Peace v. NRC*, 449 F.3d 1016 (June 2, 2006).¹ The Supreme Court has identified NEPA's "twin aims" as "plac[ing] upon an agency the obligation to consider every significant action[, and] ensur[ing] that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Baltimore Gas & Elec. Co. v. Natural Res. Def. Counsel, Inc.*, 462 U.S. 87, 97 (1983)

NEPA is the "basic charter for protection of the environment." 40 C.F.R. § 1500.1. Its fundamental purpose is to "help public officials make decisions that are based on understanding of environmental consequences, and take decisions that protect, restore and enhance the environment." *Id.* NEPA requires federal agencies to examine the environmental consequences of their actions before taking those actions, in order to ensure "that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." *Robertson v. Methow Valley Citizens Council (Robertson)*, 490 U.S. 332, 349 (1989).

NEPA goes beyond the Atomic Energy Act ("AEA") in mandating that the NRC consider alternatives to its licensing actions that may have detrimental effects on the environment. 10 C.F.R. § 51.71(d). The primary method by which NEPA ensures that its mandate is met is the "action-forcing" requirement for preparation of an EIS, which assesses the environmental impacts of the proposed action and weighs the costs and benefits of alternative actions. *Robertson*, 490 U.S. at 350-51. An EIS must be searching and rigorous, providing a "hard look" at the environmental consequences of the agency's proposed action. *Id.* at 349; *Marsh v. Oregon Natural Resources Council*, 490 U.S. 260, 374 (1989).

The environmental impacts that must be considered in an EIS include "reasonably foreseeable" impacts which have "catastrophic consequences, even if their probability of occurrence is low." 40 C.F.R. § 1502.22(b)(1). The Commission has held that probability is the "key" to determine whether an accident is "reasonably foreseeable" or whether it is "remote and speculative" and therefore need not be

¹ A petition for certiorari is expected to be filed shortly

RUTGERS ENVIRONMENTAL LAW CLINIC

considered in an EIS. *Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station)*, CLI-90-7, 32 NRC 129, 131 (1990). See also *Limerick Ecology Action v. NRC*, 869 F.2d 719, 745 (3rd Cir. 1989), citing *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 551 (1978). NRC has included consideration of the environmental impacts of design-basis accidents in its EISs since the beginning of NEPA implementation. *Limerick Ecology Action*, 869 F.2d 719 at 726, citing 36 Fed. Reg. 22,851 (1971).

In 1980, following the Three Mile Island accident, the Commission also began to consider the environmental impacts of severe or "beyond design-basis" accidents in its EISs. *Id.*, citing NRC, *Statement of Interim Policy, Nuclear Power Plant Accident Considerations Under the National Environmental Policy Act of 1969*, 45 Fed. Reg. 40,101 (1980). In addition, recently, the Ninth Circuit, concluded that it was unreasonable for the NRC to categorically dismiss the possibility of terrorist attack on a proposed spent fuel storage installation and on the entire reactor facility as too "remote and highly speculative" to warrant consideration under NEPA. *San Luis Obispo Mothers For Peace*, 449 F.3d at 1030. The court also found, as a matter of law, that NRC's position was inconsistent with the government's efforts and expenditures to combat this type of terrorist attack against nuclear facilities including establishment of the NRC's own Office of Nuclear Security and Incident Response responsible for coordination with the Office of Homeland Security. *Id.* at 1030-31.

Furthermore, the court found that to eliminate a possible environmental consequence from analysis by labeling a risk as "unquantifiable" is not supported by any provision of NEPA or any other authority cited by the Commission. See also *Limerick Ecology Action*, 869 F.2d at 754 (J. Scirica, dissenting) (finding no "statutory provision, no NRC regulation or policy statement, and no case law that permits the NRC to ignore any risk found to be unquantifiable")

RUTGERS ENVIRONMENTAL LAW CLINIC

Although an NRC-sponsored study conducted as early as 1979 raised the potential for a severe accident in a high-density fuel storage pool if water is partially lost from the pool (NUREG/CR-0649, *Spent Fuel Heatup Following Loss of Water During Storage* (March 1979), the NRC has failed to take that risk into account in every EIS it has prepared including the 1979 GEIS on the environmental impacts of fuel storage and the 1996 License Renewal GEIS on which the Oyster Creek license renewal application relies. See NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* at 5-1 (1996).

The terrorist acts of September 11, 2001, the NRC's response to those attacks, and the finding of the Ninth Circuit in *San Luis Obispo*, show that the environmental impacts of intentional destructive acts against the Oyster Creek fuel pool are reasonably foreseeable. Taken together, the potential for severe pool accidents caused by intentional malicious acts and by equipment failures and natural disasters is not only reasonably foreseeable, but is likely enough to qualify as a "design-basis accident," i.e., an accident that must be designed against under NRC safety regulations. At minimum, such an event is a "severe accident." NRC's failure to take account of this new information when preparing the DSEIS is inconsistent with NEPA's major requirement that environmental decisions must take new information into account if the information shows that a proposed action will affect the quality of the human environment "in a significant manner or to a significant extent not already considered." *Marsh*, 490 U.S. at 374.

III. Requirements of the NRC Regulations

A. NRC Implementation of the AEA

NRC regulations implement the AEA by setting detailed minimum standards for safe and secure operation of nuclear facilities. The AEA prohibits the NRC from issuing a license to operate a nuclear power plant if it would be "inimical to the common defense and security or to the health and safety of the public." 42 U.S.C. § 2133(d). Public safety is the first, last, and a permanent consideration in any

RUTGERS ENVIRONMENTAL LAW CLINIC

decision on the issuance of a construction permit or a license to operate a nuclear facility. *Power Reactor Development Corp v. International Union of Electrical Radio and Machine Workers*, 367 U.S. 396, 402 (1961).

Before a nuclear power plant is constructed, the NRC requires the operator to include a preliminary safety analysis report in the construction permit application. A nuclear power plant must be designed against accidents that are “anticipated during the life of the facility.” See 10 C.F.R. § 50.34(a)(4), which provides that a construction permit application for a nuclear power plant must include:

[A] preliminary analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents.

These “anticipated” accidents, against which nuclear power plants must be designed, are called “design-basis accidents” and include some low frequency but credible events. License Renewal GEIS at 5-2.

The NRC designates accidents that are more complex and less likely than design-basis accidents as “severe accidents.” License Renewal GEIS at 5-1 (severe accidents are “those involving multiple failures of equipment or function and, therefore, whose likelihood is generally lower than design-basis accidents but whose consequences may be higher”). Although severe accidents are “beyond the substantial coverage of design-basis events,” they constitute “the major risk to the public associated with radioactive releases from nuclear power plant accidents.” NRC, *Policy Statement on Severe Accidents Regarding Future Designs and Existing Plants*, 50 Fed. Reg. 32, 138, 32, 139 (August 8, 1985) (“Severe Accident Policy Statement”).

RUTGERS ENVIRONMENTAL LAW CLINIC

The Commission has made the generic determination that nuclear plants can be operated safely, despite the potential for severe accidents. Nevertheless, the Commission has an ongoing program to address severe accidents in the context of its regulatory program for protection of public health and safety under the AEA, and pledges to act upon any new information that calls the safety finding into question. Severe Accident Policy Statement at 139-40.

In the particular matter of stored spent nuclear fuel and high-level radioactive waste, NRC has promulgated requirements for its protection:

Each licensee subject to this section shall establish and maintain a physical protection system with the objective of providing high assurance that activities involving spent nuclear fuel and high-level radioactive waste do not constitute an unreasonable risk to public health and safety.

10 C.F.R 73.51(b)(1). To meet this objective, the physical protection system must be “designed to protect against loss of control of the facility that could be sufficient to cause a radiation exposure exceeding the total effective dose equivalent of 5 rem.” 10 C.F.R 73.51(b)(3). Furthermore, the system must be reviewed every 24 months. 10 C.F.R 73.51(d)(12).

B. NRC Treatment of Terrorist Attack

NRC had a longstanding policy that NEPA does not require consideration of the environmental impact of a terrorist attack. This was based on four 2002 decisions (Private Fuel Storage, Duke Cogema Stone & Webster, Dominion Nuclear Connecticut and Duke Energy) and the reasoning was as follows:

1. The possibility of terrorist attack is too far removed from the natural or expected consequences of agency action to require study under NEPA
2. Because the risk of terrorist attack cannot be determined, the analysis is likely to be meaningless.
3. NEPA does not require a “worst-case” analysis
4. NEPA’s public process is not an appropriate forum for sensitive security issues.

This was set out in a memorandum and order, CLI-03-1, 57 NRC 1, where the NRC accepted the Atomic Safety and Licensing Board’s referral of its decision to reject the environmental contentions related to terrorism. *San Luis Obispo Mothers For Peace*, 449 F.3d 1016. As discussed above, the

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Ninth Circuit has now ruled that the four reasons given by the NRC as grounds for this did not support the NRC's categorical refusal to consider the effects of a terrorist attack. *Id.* at 6084. Furthermore, the Ninth Circuit reiterated NEPA's direction on uncertain consequences 40 C.F.R. §§ 1502.22(b)(3), (4), which requires an agency to deal with uncertainties by including in the EIS "a summary of existing credible scientific evidence which is relevant to evaluating the reasonable foreseeable significant adverse impacts on the human environment, and... the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." The court construed the regulation to apply to those events with potentially catastrophic consequences "even if their probability of occurrence is low, provided that the analysis of impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 C.F.R. § 1502.22 (b)(4).

In addition, the NRC has now recognized that, if it is not overturned by the U.S. Supreme Court, the *San Luis Obispo* decision will require an analysis of spent fuel pool sabotage scenarios for Oyster Creek. Earlier this week, the NRC decided to postpone its review of the dismissal of a contention by the State of New Jersey that this analysis was essential, but missing. *In the Matter of AmerGen Energy Co. (License Renewal for Oyster Creek Nuclear Generating Station), LLC*, CLI-06-24 (September 6, 2006).

BBB-7

The License Renewal GEIS purports to address both design-basis accidents and severe accidents. With respect to design-basis accidents, the GEIS provides a brief statement that the impacts of design-basis accidents were considered in the original EIS for each nuclear power plant, and that the design was found adequate to "accommodate" those accidents. License Renewal GEIS at 5-11. Moreover, the GEIS asserts that the consequences of design-basis accidents are not expected to change significantly as a result of aging of the plant. *Id.* Therefore, the GEIS does not provide a further discussion of design-basis accidents. *Id.* These impacts are also classified as "Category 1 in Table B-1 of Appendix B to

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Subpart A of 10 C.F.R. Part 51. However, this approach fails to recognize that the build up of spent fuel at reactors is effectively an effect of aging, and that a new design-basis accident could arise from the storage of the spent fuel.

With respect to severe or beyond design-basis accidents, the License Renewal GEIS discusses the potential consequences of an array of severe accidents identified in various studies, primarily the NRC's most recent and comprehensive probabilistic analysis of nuclear power plant accidents, NUREG-1150, *Severe Accident Risks for Five U.S. Nuclear Power Plants* (1990). While recognizing the possibility that the likelihood of some severe accidents may be so low as to be "remote and speculative" and therefore not necessary to discuss in an EIS, the License Renewal GEIS does not exclude any severe accidents on the ground of their estimated probability. Severe accidents are classified as "Category 2" impacts in Table B-1 of Appendix B to Subpart A of 10 C.F.R. Part 51.

However, the License Renewal GEIS does not include any discussion of how deliberate and malicious attacks on nuclear power plants may increase the likelihood or consequences of severe accidents. In addition, the DSEIS it failed to make any assessment of the risks of sabotage. This is consistent with the NRC's long-established, but now obsolete, policy of refusing to examine such issues under NEPA. The rest of these comments show that the DSEIS is grossly deficient in this regard and is also deficient on many points of detail. The rest of the comments also provide a brief, very preliminary, assessment of the issues involved, based directly on work submitted by others to the NRC in pending license renewal proceedings.

IV. Analysis of Risk At Similar Plants From Spent Fuel Pool Fires

A recent filing by the Massachusetts Attorney General in license renewal proceedings for Pilgrim and Vermont Yankee Nuclear Power Plants, which are both G.E. Boiling Water Mark 1 plants, similar to Oyster Creek, provided a quantitative analysis of the risk of spent fuel pool fires. The filing

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contains two expert reports, one on the probability of a spent fuel pool fire and the options to reduce that probability, and another on the consequences of a spent fuel pool fire. The report on probability finds that where high density racks of fuel assemblies are held in spent fuel pools, a loss of cooling or rupture of the pool would probably cause a spent fuel pool fire. Gordon R. Thompson, *Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants*, 9-12 (May 25, 2006) ("Risk Report"), Ex. SC 1.

The Risk Report concluded that the probability of a spent fuel pool fire is dominated by the possibility of a malicious attack. *Id.* at 57. Thompson estimated the total probability of a spent fuel pool fire at 1.2×10^{-4} per year for both plants, comprised of a 1×10^{-4} per year chance of a successful terrorist attack and 2.1×10^{-5} per year chance of an accidental fuel pool fire. The accidental risk is around double the core damage frequency ("CDF") assumed by AmerGen. DSEIS at G-2.

The other report submitted by the Massachusetts Attorney General in the same proceeding provides an analysis of the consequences of spent fuel pool fire at the Pilgrim and Vermont Yankee plants. It shows that the consequences of a spent fuel pool fire are comparable or worse than core damage accidents. Jan Beyea, *Report To The Massachusetts Attorney General On The Potential Consequences Of A Spent-Fuel-Pool Fire At The Pilgrim and Vermont Yankee Nuclear Plants* (May 25, 2006) ("Consequence Report"), Ex. SC 2. The results are truly sobering. Bayea shows that, even excluding the cost of cleanup from a spent fuel pool fire, the consequences of such a fire at these plants would range from \$87 billion to \$878 billion and the number of induced lung cancers would range from more than 2,700 to more than 24,000. *Id.* at 9, 11, 18-19.

Combining the estimates of event probability with the predicted consequences, the Risk Report shows that a consequence of \$100 billion at a probability of 1×10^{-4} per year over twenty years would have a present value of \$110 million to \$200 million, depending on the discount rate. Risk Report at 58.

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Thus, the consequence estimates of \$87 billion to \$878 billion combined with the probability estimate of 1×10^{-4} per year yield a range of around \$100 million to \$1.8 billion for the present value of the consequences. Therefore an investment in this range would be justified to avoid the consequences of a spent fuel pool fire. This is orders of magnitude greater than the screening value of \$4.46 million used by the NRC in the SAMA analysis. DSEIS at G-12.

V. Risk Of A Spent Fuel Pool Fire At Oyster Creek

The magnitude of the risk that would be imposed upon Citizens by extending the license for an additional 20 years has been grossly underestimated in the DSEIS because the analysis fails to take account of the potential for a fire in the spent fuel pool at Oyster Creek due to accident or deliberate attack. At a qualitative level the state of New Jersey has stated that the consequences of a spent fuel pool fire could be worse than the consequences of the accident at Chernobyl and that Oyster Creek is particularly vulnerable to an attack because the spent fuel pool at the plant is elevated and densely packed. Letter from Lipoti to Miller, dated July 30, 2004, Ex. SC 3.

More specifically, New Jersey noted that it had reviewed a scientific paper which generically estimated the consequences of a terrorist attack on the spent fuel pool:

The Alvarez Paper was available to New Jersey as was the NRC staff's review and comments. This paper focused on the potential generic vulnerabilities of spent fuel pools to terrorist attack. The paper also details the possible public safety and environmental consequences should such attacks successfully occur. Included in this paper were conservative estimates of the radiological release should a spent fuel zircaloy cladding fire occur due to a significant breach of a spent fuel pool. The paper states, "The long-term land-contamination consequences of such an event could be significantly worse than those from Chernobyl". The paper further states (in reference to Chernobyl), "The total area of this radiation-control zone is huge: 10,000 km², equal to half the area of the State of New Jersey. During the following decade, the population of this area declined by almost half because of migration to areas of lower contamination".

Id. The letter then went on to highlight the plant specific vulnerability of Oyster Creek because its spent fuel pool is elevated, it has a relatively weak superstructure over the spent fuel pool, which could collapse, and it is on the coast providing an unimpeded flight path for an attacking aircraft. Id. The

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letter concluded by requesting NRC to provide New Jersey with site specific estimates of the consequences of an attack on the spent fuel pool. *Id.* As far as Citizens are aware, no such estimate has been provided. More recently New Jersey attempted to intervene in the license renewal proceeding to contend, among other things, that AmerGen's SAMA analysis was inadequate because it failed to consider the vulnerability of the spent fuel pool or mitigation measures to address this vulnerability.

Turning to a more quantitative approach, the situation at Oyster Creek is very similar to that at Pilgrim and Vermont Yankee. All three plants are G.E. Boiling Water Reactors with a Mark 1 containment system. In addition, all three plants store their spent fuel assemblies in high density racks that enclose the fuel with a neutron absorbing material to allow fuel assemblies to be placed close to each other and fit more fuel into the spent fuel pool than originally intended. NRC, Information Notice No. 87-43 (September 8, 1987); Risk Report at 9-14. In 2002, Pilgrim and Vermont Yankee stored 2,274 and 2,671 fuel assemblies, respectively. Risk Report at 41. In 1995, Oyster Creek's operator obtained permission to store 2,645 fuel assemblies in its spent fuel pool. 60 Fed. Reg. 19,309 (April 17, 1995). In 2000, AmerGen obtained permission to increase the number of fuel assemblies in the spent fuel pool by 390 to 3,035 fuel assemblies. 65 Fed. Reg. 55,061-55,064 (September 12, 2000). This action was needed to allow for continued operation of the plant. *Id.*

Citizens are aware that Oyster Creek now has a dry cask storage facility that can store spent fuel that is over five years old. However, press reports indicate that AmerGen only transfers spent fuel to dry cask storage when it runs out of room in the spent fuel pool. Robert Manor, *US: New life for old nuclear plants*, Chicago Tribune, September 18, 2004, Ex. SC 4. Thus, it appears that the amount of spent fuel currently in the elevated pool at Oyster Creek could be larger than at Pilgrim or Vermont Yankee. For simplicity, this analysis assumes that the spent fuel pool has an inventory similar to Pilgrim and Vermont Yankee.

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At root, risk is comprised of two basic elements, the probability of the event and the consequences. Regarding event probability, the State of New Jersey has suggested that Oyster Creek might be a more attractive target than other similarly designed nuclear power stations because it is closer to major population centers and, because it is on the coast, there is an unimpeded flight path. Thompson's estimate for the probability of a terrorist attack assumed that all plants are equally attractive targets. Thus, the likelihood of a spent fuel pool fire at Oyster Creek may be greater than at Pilgrim or Vermont Yankee. Although, Thompson's assumption is conservative for Oyster Creek, it is not unreasonable at the current level of uncertainty. Therefore, for simplicity, this analysis uses Thompson's estimate of 1.2×10^{-4} per year as the available best estimate of the chance of a spent fuel fire. The Commission has established a threshold of 1×10^{-7} per year as the threshold probability for design basis events at nuclear power plants. *In The Matter Of Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation)*, CLI-01-22, 54 NRC 255 (November 14, 2001). Thus, Thompson's probability estimate is three orders of magnitude greater than the threshold probability for consideration in this nuclear power plant relicensing.

Turning to the consequences, Beyea's estimates of \$87 billion to \$878 billion in consequences for Pilgrim and Vermont Yankee are probably low because the population around Oyster Creek is larger, property values in the areas are higher than in Vermont or Massachusetts, contamination from a fire at Oyster Creek could contaminate major cities on the eastern seaboard, including New York City, Philadelphia, and Trenton, and the estimate excluded consideration of clean up or reconstruction of downtown areas. Thus, it is not unreasonable to estimate that the economic consequences could be at least double those estimated for Pilgrim and Vermont Yankee, ranging from around \$180 billion to \$1.8 trillion. At a frequency of 1.2×10^{-4} per year this is equivalent to a present value of between \$200 million to \$3.6 billion.

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Even more importantly, the number of induced lung cancers would probably be even greater than the 2,700 to 24,000 estimated for Pilgrim and Vermont Yankee because the population density in the potentially affected area is considerably higher on average.

VI. Significance Of The Risk Estimates For Oyster Creek

The potential consequences of a spent fuel pool fire are startlingly large. As Beyea points out the US government borrows around \$350 billion per year. Because the government would be forced to foot nearly all of the bill for recovery after such a huge disaster² it would have a massive financial impact on the nation. Furthermore, and perhaps even more importantly, such a disaster could lead to major loss of life, loss of confidence, and long-term contamination of large areas. Taken together, these effects could have a devastating long term impact on major cities, such as New York City, Philadelphia, and Trenton. To put the consequence estimates into context they are around ten times the damage estimates for hurricane Katrina.

To look at it from a different perspective, AmerGen currently claims to be making around \$25 per Mwhr produced. Exelon Press Release, dated July 31, 2006 at 6, Ex. SC 5. Thus, assuming plant capacity of 619 Mw and a capacity factor of 95%, the total value of the electricity that could be produced by AmerGen at Oyster Creek during the proposed 20-year license extension is at most \$2.6 billion or \$129 million per year, even if nothing serious went wrong with the plant for 20 years. Thus, the externalized risk to society from the operation of the plant could actually be greater than the value to its owner of its output. In such circumstances, if no other mitigation options are available, plant closure and decommissioning would be a feasible SAMA alternative.

Plant closure and decommissioning must therefore be evaluated as a SAMA alternative in the DSEIS and Citizens believe that this is the only approach that would provide acceptable levels of risk

² Note that the Price-Anderson Act could limit AmerGen's liability for this huge loss to \$400 million and force the federal government to meet all costs over \$10 billion.

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over the long term. However, because the risk is large and imminent there is a need to mitigate this risk in the short term, rather than waiting for decommissioning. Therefore, as an initial temporary option, the dry cask storage facility offers an imperfect, but nonetheless useful option to mitigate the present risk. According to Thompson, the spent fuel at Pilgrim and Vermont Yankee that is more than 5 years old could be stored in dry casks at the site at a cost of \$43 million to \$87 million. Risk Report at 56. AmerGen has placed the cost of dry cask storage at Oyster Creek even lower at \$30 million. Robert Manor, *US: New life for old nuclear plants*, Chicago Tribune, September 18, 2004, Ex. SC 4. This cost would be incurred anyway at decommissioning, so that the net effect is to change the time at which the expenditure occurs. Risk Report at 32. Thus, the cost to AmerGen of this measure could be offset by reductions in decommissioning cost. Depending on discount rate and the life of the plant, the net cost could be between \$15 million and \$40 million.

In this way, the spent fuel pool could be converted back to its original function to turn a massive and unacceptable risk into a lower, but still unacceptable long-term risk, at relatively low cost. *Id.* at 32. Indeed, although the situation is highly uncertain, the lowest estimate of the present value of risk exceeds the highest estimate of the cost to mitigate that risk. It is therefore unclear why the NRC has not already required the risk of spent fuel pool fires to be mitigated at Oyster Creek and other reactors with elevated fuel pools. At minimum, the next draft of the DSEIS must contain a full site-specific analysis of the likelihood and consequences of a spent fuel pool fire and assess how to carry out effective mitigation.

However, merely carrying out an assessment is not enough. Even this brief assessment has shown that the densely packed elevated fuel pool at Oyster Creek currently presents terrorists with a chance of killing 20,000 to 50,000 people and causing economic disruption on a scale that dwarfs even major natural disasters like hurricane Katrina. The risk posed by the plant is totally unacceptable and

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has a present value of over \$200 million and \$3.6 billion. The net cost of transferring the fuel to a less dangerous means of storage is between \$15 million and \$40 million. Therefore, there is no question that this action meets SAMA requirements. To provide "adequate protection" for the public, NRC should take urgent action to lower the risk by ordering that the spent fuel that is beyond 5 years old to be moved to dry cask storage for temporary storage.

Unfortunately, dry cask storage not a risk free activity. Highly active nuclear waste was never intended to be stored at wet coastal sites in densely populated areas. The difficulty that the Department of Energy has had in showing whether the Yucca Mountain long -term disposal facility for this material could be acceptable, shows that storage of this material at the Oyster Creek site in the long term could not present an environmentally sound approach. In addition, concerns have been raised about the vulnerability of dry cask stores to terrorism. At minimum, the next draft of the DSEIS must consider the security and environmental risks of dry cask storage at this site for the current fuel inventory.

This assessment shows that at present the failure to find a responsible approach to managing nuclear waste is causing a huge risk to the people of New Jersey and other states. This risk can be reduced, but cannot be totally eliminated, by moving the spent fuel to dry cask storage as quickly as possible. Because there is currently no acceptable method of disposing of spent fuel, it is simply irresponsible to allow AmerGen to continue to generate waste. Thus, Citizens firmly believe that the NRC should not allow AmerGen to operate Oyster Creek beyond its currently licensed operating period. At minimum, the DSEIS must assess how increasing the amount of spent fuel stored at Oyster Creek by 50% would change the current risks presented by the spent fuel on the site to the public and the environment.

Although the NRC has been on notice of the potential for spent fuel pool fires since at least 1994, the risk of such a fire being caused by terrorist attack has not been assessed generically. Thus, the

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reliance in the DSEIS on a generic determination of environmental significance of spent fuel pool storage during decommissioning is misplaced. DSEIS at xvi-xvii. By failing to analyze the risk of spent fuel pool fire from a terrorist attack or an accident during operation, the DSEIS is grossly deficient and would violate NEPA requirements unless this deficiency is remedied.

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VII. Other Inadequacies of the DSEIS

Thompson estimated the probability of an accidental fuel pool fire as 2.1×10^{-5} per year. This is around double the core damage frequency ("CDF") of 1.1×10^{-5} per year assumed by AmerGen. DSEIS at G-2. Although NRC may have looked at the chance of a spent fuel pool fire during decommissioning, many of the initiating events contributing to accidental spent fuel pool fires are not present during decommissioning. Thus, the risk of an accidental spent fuel pool fire during operation is significant and has not been assessed generically. Therefore this risk must be considered in the revised SAMA analysis, in addition to the risk of terrorist attack. At present, it is completely omitted.

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The DSEIS states that the value of eliminating all internal and external severe event risk is \$4.46 million, DSEIS at G-12, but fails to provide any elaboration about how this estimate was derived. Working backwards, a consequence of \$100 billion at a probability of 1×10^{-5} per year has a present value of around \$15 million. Risk Report at 9-2. Because the CDF in the analysis is close to this level of probability and the screening value is around a third of the present value estimated, the consequences assumed in the analysis to derive the screening value must be of the order of \$33 billion.³ This amount is confirmed by the assumption in the appendix that the total cost of cleanup and decontamination after a severe accident would be \$110 billion. DSEIS at G-28. This is surprising because the NRC has previously found that destruction of a private spent fuel storage facility would have lower consequences than a severe nuclear accident. NRC, CLI-01-22 Memorandum and Order, 54 NRC 255 (November 14, 2001). Beyea also points to another reason why the consequence estimate is far too low in the DSEIS.

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³ This is a simplistic calculation made for illustrative purposes only.

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The standard value of \$2,000 per person-rem used in the report, DSEIS at G-28, leads to a valuation of an avoided cancer death of \$200,000, which is far too low. Consequence Report at 14. This means the SAMA analysis at Oyster Creek must be recalculated placing a much higher value on the lives of the public who live close to the plant.

In addition, an assumption of \$33 billion in consequences would contrast starkly with the estimate of consequences from a spent fuel pool fire of \$180 billion to \$3.6 trillion and is at variance with the NRC's previous position that a spent fuel facility accident would be of less consequence than an accident involving core damage. The Risk and Consequence Reports taken together suggest that the DSEIS has failed to assess the dominant source of risk at the Oyster Creek site. It is important to remember that when the plant was initially licensed the risk from the spent fuel pool was zero, because the pool was empty. In addition, the NRC did not intend to allow spent fuel to be packed in pools in the way it is now. Although NRC may have looked at the chance of a spent fuel pool fire during decommissioning, no generic assessment of the risk from spent fuel fires during operation has been carried out. Because the risk of a spent fuel pool fire now appears to dominate the risk presented by the plant, it quite extraordinary that the DSEIS fails to address the issue in detail. Producing an evaluation that grossly underestimates the risk of an action is actually worse than producing no assessment, because it may well lead to a decision based on a completely false assurance about risk levels. This is exactly what Congress intended to prevent when it enacted NEPA.

BBB-11

The DSEIS suggests that there is no new significant information that leads to questions about the validity of the GEIS. DSEIS at 5-3. This is totally incorrect. The information presented by Thompson and Bayea is itself significant new information about the risks posed by the operation of BWR Mark 1 reactors. In addition to the analysis of spent fuel pool fire risks, Bayea also shows that new studies indicate that low-level radiation does could cause more cancers than thought when the GEIS was written

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in 1996. Consequence Report at 12-15. Both the Risk Report and the Consequence Report were submitted to the NRC on May 25, 2006, before the DSEIS was finalized in June 2006. In addition, as the Court of Appeals for the Ninth Circuit has found, the events of September 11, 2001 mean that the NRC must now take account of terrorist risks in SEIS Reports about licensing decisions. *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Commission*, No. 03-74628, 2006 WL 1511889 (9th Cir. June 2, 2006). Furthermore, that assessment must be complete before the NRC can take any action to extend the license. Thus, the DSEIS must be revised to take account of much significant new information.

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NRC provides a completely inadequate justification for the use of a factor of 2 times the benefit of SAMAs designed to mitigation internal events to take account for external events, including sabotage. DSEIS at 8-9. This seems totally arbitrary because it is not necessarily true that mitigation measures to prevent sabotage and earthquakes would also mitigate risks from internal events.

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As discussed above, the screening level of \$4.46 million, DSEIS at G-12, is unjustifiably low and must be revised substantially to take account of new cancer risk studies, higher values of life, and the substantial risks presented by the accidental triggering of a spent fuel pool fire during operation, as well as the risk of terrorism.

It is notable that Amergen's process failed to focus on the risk of terrorism or of a spent fuel pool fire. DSEIS at G-13. Thus, NRC's conclusion that the process was systematic and comprehensive is totally wrong. DSEIS at 14. In addition, the Risk and Consequence reports show that NRC's conclusion that there are no impacts related to design basis accidents beyond those discussed in the generic EIS is false. DESIS at 5-3.

VIII. Conclusion

For the reasons articulated in this comment letter, NRC should not and cannot make any conclusions about either the risks of accident or terrorism associated with the proposed relicensing of the

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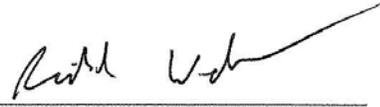
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Facility or the license renewal application. Therefore, NRC cannot finalize the EIS and must prepare a new draft that addresses the inadequacies raised in this letter and submit it for public comment. Until a proper EIS is prepared and reviewed, NRC should not make any decisions with respect to the relicensing of Oyster Creek. To do otherwise would constitute an impermissible, irrevocable commitment of resources in violation of NEPA

We thank you for the opportunity to submit these written comments.

Sincerely,

By:



Richard Webster, Esq.
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September 14, 2006

VIA EMAIL AND U.S. MAIL

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
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OysterCreekEIS@nrc.gov

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RULES AND DIRECTIVES
BRANCH
U.S. NRC

Re: NUREG-1437: Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28, Regarding Oyster Creek Nuclear Generating Station Draft Report for Comment: Comments on Safety and Security Aspects

Please accept these supplementary written comments submitted on behalf of Nuclear Information and Resource Service, Jersey Shore Nuclear Watch, Inc., Grandmothers, Mothers and More for Energy Safety, New Jersey Public Interest Research Group, New Jersey Sierra Club, and New Jersey Environmental Federation (collectively "Citizens") on the safety and security aspects of the above-referenced Draft Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants, Supplement 28, regarding Oyster Creek Nuclear Power Plant ("DSEIS"). These comments supplement the comments previously been submitted on DSEIS by myself and Julia Huff under separate cover. The NRC should consider and respond to all our submitted comments, because they are complementary and not duplicative.

In our previous comments we complained that NRC had failed to assess the effects of the potential accumulation of spent fuel on the site if the reactor continues to operate beyond the term of the existing license. This situation has been made even more likely by the Department of the Interior's recent decisions not to allow a private spent fuel repository to be constructed. I attach these decisions, which the NRC should regard as significant new information.

CCC-1

50KSE Review Complete

E-RIDS = ADM-03

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This new information underscores that an off-site spent fuel repository is unlikely to open for at least 20 more years. Thus, it is completely foreseeable that spent fuel would accumulate further on the site, if the license extension were granted. This issue must therefore be addressed in the DSEIS, which would otherwise fail to meet the requirements of NEPA to look at the foreseeable environmental consequences of major federal actions.

We thank you for the opportunity to submit these written comments.

Sincerely,

By: 

Richard Webster, Esq.
Rutgers Environmental Law Clinic, Citizens' Counsel

Enclosures.

Appendix B

Contributors to the Supplement

Appendix B

Contributors to the Supplement

The overall responsibility for the preparation of this supplement was assigned to the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (NRC). The supplement was prepared by members of the Office of Nuclear Reactor Regulation with assistance from other NRC organizations, Argonne National Laboratory, Pacific Northwest National Laboratory, and Information Systems Laboratories, Inc.

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(a) Argonne National Laboratory is operated for the U.S. Department of Energy by UChicago Argonne, LLC.
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 (c) Information Systems Laboratories, Inc., is located in Rockville, Maryland.

Appendix C

Chronology of NRC Staff Environmental Review Correspondence Related to the AmerGen Energy Company, LLC, Application for License Renewal of Oyster Creek Nuclear Generating Station

Appendix C

Chronology of NRC Staff Environmental Review Correspondence Related to the AmerGen Energy Company, LLC, Application for License Renewal of Oyster Creek Nuclear Generating Station

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and AmerGen Energy Company, LLC (AmerGen), and other correspondence related to the NRC staff's environmental review, under Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51), of AmerGen's application for renewal of the Oyster Creek Nuclear Generating Station (OCNGS) operating license. All documents, with the exception of those containing proprietary information, have been placed in the Commission's Public Document Room, at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, and are available electronically from the Public Electronic Reading Room found on the Internet at the following web address: <http://www.nrc.gov/reading-rm.html>. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents in the Publicly Available Records System (PARS) component of ADAMS. The ADAMS accession numbers for each document are included below.

- | | |
|-------------------|--|
| July 22, 2005 | Letter from AmerGen to NRC, forwarding the application for renewal of the operating license for OCNGS, requesting an extension of the operating license for an additional 20 years (Accession No. ML053050477). |
| July 29, 2005 | Letter from NRC to AmerGen, "Receipt and Availability of the License Renewal Application for the Oyster Creek Nuclear Generating Station" (Accession No. ML052100022). |
| September 9, 2005 | Letter from NRC to AmerGen, transmitting "Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding the Application from AmerGen Energy Company, LLC, for Renewal of the Operating License for the Oyster Creek Nuclear Generating Station" (Accession No. ML052520034). |

Appendix C

- September 16, 2005 Letter from NRC to AmerGen, forwarding the *Federal Register* Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping in Support of the Review of the License Renewal Application (Accession No. ML052590296).
- October 12, 2005 Letter from NRC to Mr. Clifford Day, U.S. Fish and Wildlife Service (FWS), New Jersey Field Office, "Request for List of Protected Species Within the Area Under Evaluation for the Oyster Creek Nuclear Generating Station License Renewal" (Accession No. ML052870166).
- October 12, 2005 Letter from NRC to Ms. Dorothy Guzzo, New Jersey State Historic Preservation Office, "Oyster Creek Nuclear Generating Station License Renewal Review" (Accession No. ML052870531).
- October 12, 2005 Letter from NRC to Mr. Don Klima, Advisory Council on Historic Preservation, "Oyster Creek Nuclear Generating Station License Renewal Review" (Accession No. ML052870543).
- October 12, 2005 Letter from NRC to Ms. Patricia A. Kurkul, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service, Northeast Regional Office, "Request for List of Protected Species and Essential Fish Habitat Within the Area Under Evaluation for the Oyster Creek Nuclear Generating Station License Renewal" (Accession No. ML052870502).
- October 12, 2005 Letter from NRC to Mr. Robert Chicks, President, Stockbridge-Munsee Community, inviting participation in the scoping process related to NRC's environmental review of the license renewal application for Oyster Creek Nuclear Generating Station (Accession No. ML052900227).
- October 12, 2005 Letter from NRC to The Honorable Joe Brooks, Chief, Delaware Tribe of Indians, inviting participation in the scoping process related to NRC's environmental review of the license renewal application for Oyster Creek Nuclear Generating Station (Accession No. ML052870553).

October 12, 2005	Letter from NRC to Ms. Tamara Francis, Native American Graves Protection and Repatriation Act (NAGPRA) Director, Delaware Nation of Western Oklahoma, inviting participation in the scoping process related to NRC's environmental review of the license renewal application for Oyster Creek Nuclear Generating Station (Accession No. ML052870571).
October 12, 2005	Letter from NRC to The Honorable Mark Gould, Tribal Chairman, Nanticoke Leni-Lenape Indians of New Jersey, inviting participation in the scoping process related to NRC's environmental review of the license renewal application for Oyster Creek Nuclear Generating Station (Accession No. ML052870563).
October 12, 2005	Letter from NRC to Mr. Brice Obermeyer, NAGPRA Director, The Delaware Tribe, inviting participation in the scoping process related to NRC's environmental review of the license renewal application for Oyster Creek Nuclear Generating Station (Accession No. ML052870572).
November 2, 2005	Email from Ms. Deborah Fimbel, New Jersey State Historic Preservation Office, to NRC, "Oyster Creek Nuclear Generating Station license renewal and invitation to public scoping meeting" (Accession No. ML053070461).
November 9, 2005	Letter from NRC to AmerGen, "Request for Additional Information (RAI) Regarding Severe Accident Mitigation Alternatives (SAMAs) for Oyster Creek Nuclear Generating Station" (Accession No. ML053130387).
November 15, 2005	Letter from Barnegat Bay National Estuary Program to NRC regarding environmental review of Oyster Creek Nuclear Generating Station (Accession No. ML053220253).
November 23, 2005	Letter from Mr. Clifford Day, U.S. Fish and Wildlife Service (FWS), New Jersey Field Office, to NRC, "Scoping Comments on Applicant's Environmental Report - Operating License Renewal Stage, Oyster Creek Generating Station" (Accession No. ML053360432).

Appendix C

- December 8, 2005 “Summary of Public Scoping Meetings Regarding the Review of Oyster Creek Nuclear Generating Station License Renewal Application” (Accession No. ML053430247).
- | December 8, 2005 Letter from NRC to AmerGen, “Request for Additional Information (RAI) Regarding the Environmental License Renewal Review for the Oyster Creek Nuclear Generating Station” (Accession No. ML053430198).
- January 9, 2006 Letter from AmerGen to NRC, “Response to NRC Request for Additional Information Related to Severe Accident Mitigation Alternatives (SAMA) for Oyster Creek Generating Station” (Accession No. ML060130238).
- | January 30, 2006 Letter from New Jersey State Representatives L.T. Connors, Jr., C.J. Connors, and B.E. Rumpf to the NRC regarding constituent’s concerns about fish kills (Accession No. ML060730108).
- February 21, 2006 Letter from NRC to AmerGen, “Issuance of Environmental Scoping Summary Report Associated with the Staff’s Review of the Application by AmerGen for Renewal of the Operating License for the Oyster Creek Nuclear Generating Plant” (Accession No. ML060530691).
- March 2, 2006 Letter from AmerGen to NRC, “Correction of Minor Errors in the Oyster Creek Generating Station License Renewal Application” (Accession No. ML060660177).
- March 8, 2006 Letter from AmerGen to NRC, “Response to NRC Request for Additional Information Regarding the Environmental License Renewal Review for the Oyster Creek Generating Station” (Accession No. ML060720126).
- | March 13, 2006 Letter from NRC to L.T. Connors, Jr., New Jersey State Representative, regarding constituent’s concerns about fish kills (Accession No. ML060720453).
- |
- March 15, 2006 Letter from AmerGen to NRC, “Clarifications to Responses to NRC Request for Additional Information Related to Severe Accident Management (sic) Alternatives (SAMA) for Oyster Creek Generating Station” (Accession No. ML060760379).

June 9, 2006	Letter from NRC to Ms. Patricia A. Kurkul, NOAA, National Marine Fisheries Service, Northeast Regional Office, "Request Initiation of an Essential Fish Habitat Consultation Regarding License Renewal of Oyster Creek Nuclear Generating Station" (Accession No. ML061500190).
June 13, 2006	Letter from NRC to Ms. Dorothy Guzzo, New Jersey State Historic Preservation Office, "Oyster Creek Nuclear Generating Station License Renewal" (Accession No. ML061580022).
September 28, 2006	Letter from Mr. Peter D. Colosi, Jr., NOAA, National Marine Fisheries Service, Northeast Regional Office to NRC, "Essential Fish Habitat Consultation Regarding License Renewal of Oyster Creek Nuclear Generating Station (TAC No. MC7625)" (Accession No. ML062890168).
October 18, 2006	Letter from NRC to Mr. Peter D. Colosi, Jr., NOAA, National Marine Fisheries Service, Northeast Regional Office to NRC, "Letter Received on October 16, 2006, Regarding the Essential Fish Habitat for License Renewal of Oyster Creek Nuclear Generating Station (TAC # MC7625)" (Accession No. ML062930088).
November 21, 2006	Letter from Ms. Patricia A. Kurkul, NOAA, National Marine Fisheries Service, Northeast Regional Office, to NRC, "Biological Opinion for Oyster Creek Nuclear Generating Station" (Accession No. ML063320346).
December 1, 2006	Letter from AmerGen to NRC, "Federal Consistency Certification for Oyster Creek Generating Station License Renewal Application" (Accession No. ML063380072).
December 4, 2006	Email from AmerGen, to NRC, "Re: Non-rad Wastes" (Accession No. ML063380366).
December 5, 2006	Letter from NRC to Mr. Peter D. Colosi, Jr., NOAA, National Marine Fisheries Service, Northeast Regional Office to NRC, "Response to Essential Fish Habitat Conservation Recommendation Regarding the Proposed License Renewal of Oyster Creek Nuclear Generating Station" (Accession No. ML063330176).

Appendix D

Organizations Contacted

Appendix D

Organizations Contacted

During the course of the U.S. Nuclear Regulatory Commission staff's independent review of environmental impacts from operations during the renewal term, the following Federal, State, regional, local, and Native American Tribal agencies were contacted:

Barnegat Bay National Estuary Program, Toms River, New Jersey.

Delaware Nation of Western Oklahoma, Anadarko, Oklahoma

Delaware Tribe of Indians, Bartlesville, Oklahoma

Lacey Township, New Jersey

Nanticoke Leni-Lenape Indians, Bridgeton, New Jersey

National Marine Fisheries Service, Gloucester, Massachusetts

New Jersey Department of Environmental Protection, Trenton, New Jersey

New Jersey Department of Environmental Protection, Bureau of Nuclear Engineering, Trenton, New Jersey

New Jersey Department of Environmental Protection, Endangered and Non-game Species Program, Trenton, New Jersey

New Jersey Department of Environmental Protection, Historic Preservation Office, Trenton, New Jersey

New Jersey Pinelands Commission, New Lisbon, New Jersey

Ocean County, Department of Planning, Toms River, New Jersey

Stockbridge-Munsee Community, Bowler, Wisconsin

The Delaware Tribe, Emporia, Kansas

U.S. Fish and Wildlife Service, Pleasantville, New Jersey

U. S. Environmental Protection Agency, Region 2, New York, New York

Appendix E

AmerGen Energy Company, LLC's Compliance Status and Consultation Correspondence

Appendix E

AmerGen Energy Company, LLC's Compliance Status and Consultation Correspondence

Correspondence received during the process of evaluation of the application for renewal of the license for Oyster Creek Nuclear Generating Station (OCNGS) is identified in Table E-1. Copies of the correspondence are included at the end of this appendix.

The licenses, permits, consultations, and other approvals obtained from Federal, State, regional, and local authorities for OCNGS are listed in Table E-2.

Table E-1. Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (P.T. Kuo)	Stockbridge-Munsee Community (R. Chicks)	October 12, 2005 ^(a)
U.S. Nuclear Regulatory Commission (P.T. Kuo)	U.S. Fish and Wildlife Service (C. Day)	October 12, 2005
U.S. Nuclear Regulatory Commission (P.T. Kuo)	New Jersey State Historic Preservation Officer (D. Guzzo)	October 12, 2005
U.S. Nuclear Regulatory Commission (P.T. Kuo)	Advisory Council on Historic Preservation (D. Klima)	October 12, 2005
U.S. Nuclear Regulatory Commission (P.T. Kuo)	National Marine Fisheries Service (P. Kurkul)	October 12, 2005
New Jersey State Historic Preservation Officer (D. Fimbel)	U.S. Nuclear Regulatory Commission (M. Masnik)	November 2, 2005
U.S. Fish and Wildlife Service (C. Day)	U.S. Nuclear Regulatory Commission (M. Lesar)	November 23, 2005
U.S. Nuclear Regulatory Commission (F. Gillespie)	National Marine Fisheries Service (P. Kurkul)	June 9, 2006
U.S. Nuclear Regulatory Commission (R. Franovich)	New Jersey State Historic Preservation Office (D. Guzzo)	June 13, 2006
National Marine Fisheries Service (P.D. Colosi, Jr.)	U.S. Nuclear Regulatory Commission (F. Gillespie)	September 28, 2006
U.S. Nuclear Regulatory Commission (F. Gillespie)	National Marine Fisheries Service (P.D. Colosi, Jr.)	October 18, 2006

Appendix E

Source	Recipient	Date of Letter
National Marine Fisheries Service (P.A. Kurkul)	U.S. Nuclear Regulatory Commission (F. Gillespie)	November 21, 2006
AmerGen Energy Company, LLC (T. Rausch)	U.S. Nuclear Regulatory Commission (P.T. Kuo)	December 1, 2006
U.S. Nuclear Regulatory Commission (P.T. Kuo)	National Marine Fisheries Service (P.D. Colosi, Jr.)	December 5, 2006

(a) Similar letters were sent to four other Native American Tribes listed in Appendix C.

Table E-2. Federal, State, Local, and Regional Licenses, Permits, Consultations, and Other Approvals for Oyster Creek Nuclear Generating Station

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NRC	10 CFR Part 50	Operating license, Oyster Creek Nuclear Generating Station	DPR-16	04/09/69	04/09/09	Authorizes operation of OCNGS.
DOT	49 USC 5108	Registration	052804 700 004MO	05/28/04	06/30/07	Authorizes hazardous materials shipment.
FWS	Section 7 of the Endangered Species Act (16 USC 1536)	Consultation	NA	NA	NA	Requires a Federal agency to consult with the FWS regarding whether a proposed action will affect endangered or threatened species.
NMFS	Endangered Species Act (16 USC 1531-1544)	Incidental Take Permit – Sea Turtles	NA	Ongoing	Ongoing	Possession and disposition of impinged or stranded sea turtles.
NJDEP, Division of Parks and Forestry	Section 106 of the National Historic Preservation Act (16 USC 470f)	Consultation	NA	NA	NA	The National Historic Preservation Act requires Federal agencies to take into account the effect of any undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.
NJDEP, Land Use Regulations	Federal Coastal Zone Management Act (16 USC 1452 et seq.)	Certification	NA	NA	NA	Requires applicant to prove certification to Federal agency issuing the license that license renewal would be consistent with the Federally approved State Coastal Zone Management program. Based on its review of the proposed activity, the State must concur with or object to the applicant's certification.
NJDEP	Clean Water Act, Section 401 (33 USC 1341)	Certification	NA	NA	NA	State issuance of NPDES permit constitutes 401 certification.

Table E-2. (contd)

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NJDEP	Clean Water Act (33 USC 1251 et seq.); NJ Statutes Annotated (N.J.S.A.) Water Pollution Control Act 58:10A et seq.; and NJ Administrative Code (NJAC) 7:14 et seq.	New Jersey Pollutant Discharge Elimination System Permit – surface water	NJ0005550	10/24/94	Remains in effect pending State action on current application	Wastewater (industrial surface water, thermal surface water, and stormwater runoff) discharges to Oyster Creek, Forked River, and South Branch of the Forked River.
NJDEP	Clean Water Act (33 USC 1251 et seq.); N.J.S.A. 58:10A et seq.; NJAC 7:14A et seq.	New Jersey Pollutant Discharge Elimination System Permit – groundwater	NJ101966	02/20/04	02/20/09	Wastewater (percolation lagoon, underground injection, dredge spoils) to groundwater.
NJDEP	Coastal Area Facility Review Act (N.J.S.A. 13:19-1 et seq.); Waterfront Development Act (N.J.S.A. 12:5-3); Wetlands Act (N.J.S.A. 13:9A-1 et seq.)	Certification	NA	NA	NA	Compliance with coastal zone management rules, freshwater wetlands protection rules, and Coastal Permit Program rules.
NJDEP	Water Supply Management Act (N.J.S.A. 58:1A et seq.)	Water Use Registration	11108W	07/25/01	NA	Registers two wells with collective diversions of less than 100,000 gallons per day.
NJDEP	NJAC 7:7A	Freshwater Wetlands Statewide General Permit	1500-02-0004.1	06/04/02	06/04/07	Remove vegetation from fire pond.
NJDEP	Chapter 251, Soil Erosion and Sediment Control Act, PL 195	Certificate	SCD 1302	07/09/05	01/09/09	Soil Erosion Control and Sediment Control Plan for upland dredge disposal site.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (N.J.S.A. 26:2C-9.2)	Certificate to operate	PCP970001	09/08/97	09/08/07	Air emissions for DL-42 boiler and DL-68 boiler.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (N.J.S.A. 26:2C-9.2)	Certificate to operate	PCP970002	10/09/02	10/09/07	Emergency Fire Diesel 1-2.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (N.J.S.A. 26:2C-9.2)	Certificate to operate	PCP970003	11/14/97	11/14/07	#1 Boiler.

Table E-2. (contd)

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP970005	01/08/03	01/08/08	Forked River Emergency Fire Diesel.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP970006	10/31/02	10/29/07	Dirty Oil Lube Tank.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP960005	03/23/04	03/23/09	Aboveground Gasoline Storage Tank.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP960006	07/10/04	07/10/09	Emergency Generator 1.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP960007	07/10/04	07/10/09	Emergency Diesel Generator 2.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	E801	06/26/96	06/26/11	Grit Blaster.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP020001	07/29/02	07/28/07	Emergency Fire Diesel 1-1.
NJDEP	NJAC 7:14B	Certificate to operate	GEN000001	07/18/05	07/18/10	Emergency Generator 2.
NJDEP	Clean Water Act (33 USC 1251 et seq.); Clean Air Act (42 USC 7401 et seq.); Resource Conservation and Recovery Act (42 USC 6901 et seq.); Water Pollution Control Act (NJSA 48:10A et seq.); Industrial Site Recovery Act (NJSA 26:2C-1 et seq. and NJAC 7:14B)	Registration	UST 000002	08/24/04	08/24/09	Underground Storage Tank – Emergency Spill Tank.

Table E-2. (contd)

Agency	Authority	Description	Number	Issue Date	Expiration Date	Remarks
NJDEP	NJAC 7:18 et seq.	Laboratory certification	15304	06/30/06	06/30/07	State-certified laboratory to perform listed analyses.
NJDOT	Fish and Game, Wild Birds and Animals	License	H-205	01/31/06	01/31/07	Oyster Creek Helistop.
NJDEP	Clean Air Act (42 USC 7401 et seq.); Air Pollution Control Act (NJSA 26:2C-9.2)	Certificate to operate	PCP960004	02/13/06	02/13/11	Emergency Diesel Generator Fuel Oil Storage Tank.
SCDHEC	South Carolina Radioactive Waste Transportation and Disposal Act (Act No. 429)	South Carolina Radioactive Waste Transport Permit	0043-29-04	12/31/05	-	Transportation of radioactive waste into the state of South Carolina.
VDEP	Virginia Department of Emergency Management Title 44, Code of Virginia, Chapter 3.3, Section 44-146.3	Virginia Registration to Transport Hazardous Radioactive Materials	AO-S-063006	06/30/06	07/31/08	Transport of hazardous radioactive materials.
TDEC	Tennessee Department of Environment and Conservation Rule 1200-2-10.32	Tennessee Radioactive Waste License-for-Delivery	T-NJ001-L04	12/31/05	-	Transportation of radioactive waste into the state of Tennessee.
NJDEP	40 CFR 266 Subpart N, NJAC 7:26G	Conditional Exemption	NA	NA	NA	Storage and treatment of low-level mixed waste.
Ocean County Utilities Authority	NA	Agreement	NA	NA	NA	OCNGS provides continuous radiation monitoring of discharges of OCNGS wastewater to publicly owned treatment facility.

Table E-2. (contd)

-	=	date not given
CFR	=	Code of Federal Regulations
DOT	=	U.S. Department of Transportation
FWS	=	U.S. Fish and Wildlife Service
NA	=	not applicable
NJAC	=	New Jersey Administrative Code
NJDEP	=	New Jersey Department of Environmental Protection
NJDOT	=	New Jersey Department of Transportation
NJSA	=	New Jersey Statutes Annotated
NMFS	=	National Marine Fisheries Service
NPDES	=	National Pollutant Discharge Elimination System
NRC	=	U.S. Nuclear Regulatory Commission
OCNGS	=	Oyster Creek Nuclear Generating Station
PL	=	Public Law
SCDHEC	=	South Carolina Department of Health and Environmental Control
TDEC	=	Tennessee Department of Environment and Conservation
USC	=	United States Code
VDEP	=	Virginia Department of Environmental Protection



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 12, 2005

Mr. Robert Chicks
President, Stockbridge-Munsee Community
N8476 Mo He Con Nuck Road
Bowler, WI 54416

**SUBJECT: REQUEST FOR COMMENTS CONCERNING THE OYSTER CREEK NUCLEAR
GENERATING STATION APPLICATION FOR OPERATING LICENSE
RENEWAL (TAC NO. MC7625)**

Dear Mr. Chicks:

The U.S. Nuclear Regulatory Commission (NRC) is seeking input for its environmental review of an application from AmerGen Energy Company, LLC (AmerGen) for the renewal of the operating license for the Oyster Creek Nuclear Generating Station (OCNGS), located in Lacey Township in Ocean County, New Jersey. OCNGS is in close proximity to lands that may be of interest to the Stockbridge-Munsee Community. As described below, the NRC process includes an opportunity for public and inter-governmental participation in the environmental review. We want to ensure that you are aware of our efforts and, pursuant to Title 10 of the *Code of Federal Regulations* Part 51.28(b) (10 CFR 51.28(b)), the NRC invites the Stockbridge-Munsee Community to provide input to the scoping process relating to the NRC's environmental review of the application. In addition, as outlined in 36 CFR 800.8, the NRC plans to coordinate compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, with the requirements of the National Environmental Policy Act of 1969, as amended.

Under NRC regulations, the original operating license for a nuclear power plant has a term of up to 40 years. The license may be renewed for up to an additional 20 years if NRC requirements are met. The current operating license for OCNGS will expire on April 9, 2009. AmerGen submitted its application for renewal of the OCNGS operating license on July 22, 2005.

The NRC is gathering information for an OCNGS site-specific supplement to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437. The supplement will contain the results of the review of potential environmental impacts on the area surrounding the OCNGS site that are related to terrestrial ecology, aquatic ecology, hydrology, cultural resources, and socioeconomic issues, among others, and will contain a recommendation regarding the environmental acceptability of the license renewal action.

The NRC will hold two public scoping meetings for the preparation of the OCNGS Supplemental Environmental Impact Statement (SEIS) on November 1, 2005, at the Quality Inn located at 815 Route 37 in Toms River, New Jersey. There will be two sessions to accommodate interested parties. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. Additionally, the NRC staff will host informal discussions one hour before the start of each session. To be considered, comments must be provided either at the transcribed public meetings or in writing. No formal comments on the proposed scope of the supplement to the GEIS will be accepted during informal discussions. The application is electronically available for inspection from the Publicly

R. Chicks

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Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS) under Accession Number ML052080172. ADAMS is accessible at www.nrc.gov/reading-rm/adams.html and provides access through the NRC's Public Electronic Reading Room link. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by e-mail at pdr@nrc.gov. In addition, the application can be viewed on the Internet at www.nrc.gov/reactors/operating/licensing/renewal/applications/oystercreek.html.

A paper copy of the application can be viewed at the NRC's PDR, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, 20852-2738 and at the Lacey Public Library located at 10 East Lacey Road, Forked River, NJ 08731. The GEIS, which assesses the scope and impact of environmental effects that would be associated with license renewal at any nuclear power plant site, can also be found on the NRC's website or at the NRC's PDR.

Please submit any written comments that the Stockbridge-Munsee Community may have on the scope of the environmental review by November 25, 2005. Comments should be submitted by mail to the Chief, Rules and Directives Branch, Division of Administrative Services, Mail Stop T-6D59, U.S. Nuclear Regulatory Commission, Washington D.C. 20555-0001. At the conclusion of the scoping process, the NRC staff will prepare a summary of the significant issues identified and the conclusions reached, and mail a copy to you.

The NRC will issue the draft SEIS for public comment (anticipated publication date June 2006), and will hold another set of public meetings in the site's vicinity to solicit comments on the draft. A copy of the draft SEIS will be sent to you for your review and comment. After consideration of public comments received on the draft, the NRC will prepare a final SEIS. The issuance of a final SEIS for OCNCS is planned for February 2007. If you need additional information regarding the environmental review process, please contact Dr. Michael Masnik, Senior Environmental Project Manager, at 301-415-1191 or by e-mail at mtm2@nrc.gov.

Sincerely,



Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-219

cc: See next page



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 12, 2005

Mr. Clifford Day, Administrator
New Jersey Field Office
U.S. Fish and Wildlife Service
927 N. Main Street
Heritage Square, Building D
Pleasantville, New Jersey 08232

**SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER
EVALUATION FOR THE OYSTER CREEK NUCLEAR GENERATING STATION
LICENSE RENEWAL (TAC NO. MC7625)**

Dear Mr. Day:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application submitted by AmerGen Energy Company, LLC (AmerGen) for the renewal of the operating license for the Oyster Creek Nuclear Generating Station (OCNGS). OCNGS is a single-unit nuclear plant located in Lacey Township in Ocean County, New Jersey. As part of the review of the license renewal application, the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of the National Environmental Policy Act (NEPA) of 1969, as amended, which includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife. This letter is submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

AmerGen stated that it has no plans to alter current operations over the license renewal period, and that OCNGS operating under a renewed license would use existing plant facilities and transmission lines and would not require additional construction or disturbance of new areas. Any maintenance activities would be limited to previously disturbed areas.

OCNGS is situated on approximately 800 acres of land in the coastal pine barrens of New Jersey approximately 9 miles south of Toms River, New Jersey. The property is on the western shore of Barnegat Bay. East of U.S. Highway 9 the northern site boundary is the South Branch of Forked River, and the southern site boundary is Oyster Creek. West of U.S. Highway 9 the site boundary is defined by the manmade intake and discharge canals (See Enclosed Maps).

OCNGS employs a once-through heat dissipation system designed to remove waste heat from the condensers. The circulating water system includes the intake canal, an intake structure divided into two bays, circulating water pumps, condensers, dilution pumps, discharge pipes, and discharge canal. The purpose of the dilution pumps is to decrease the attractiveness of the heated discharge to migratory marine species during the spring and fall, and to reduce thermal stress on organisms in the discharge canal during the summer. An angled boom in the intake canal immediately in front of the intake prevents large mats of eelgrass and algae from clogging the intake system. Barnegat Bay is the plant's cooling water source and heat sink. Cooling water is drawn from Barnegat Bay through the South Branch of Forked River and into a

C. Day

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150-foot-wide intake canal dredged to a depth of 10 feet. The circulating water is returned to the 150-foot-wide discharge canal and from there flows to Oyster Creek and back to Barnegat Bay. Depths in the South Branch of the Forked River, canals, and lower reaches of Oyster Creek are maintained by periodic dredging.

The transmission lines in the scope of NRC's environmental review for license renewal are those that were originally constructed for the specific purpose of connecting the plant to the transmission system. A single 230-kilovolt transmission line was built to connect OCNGS to the electric grid. It is a double circuit line hung on a single set of towers that runs 11.1 miles from the OCNGS 230 kilovolt Substation to the Manitou Substation near Toms River. Beyond the OCNGS substation transformer-side disconnects, the line is owned and operated, and corridor easements held, by FirstEnergy, an Ohio utility. The transmission line corridor is 240-foot-wide and approximately parallels the New Jersey State Parkway, occupying about 320 acres. The corridor passes through land that is primarily pine forest and swamp forest. Approximately 1 mile of the line passes through Double Trouble State Park. The line is in Ocean County and crosses numerous county roads and the New Jersey State Parkway. FirstEnergy plans to maintain this transmission line, which is integral to the larger transmission system, indefinitely. The transmission line will remain a permanent part of the transmission system after OCNGS is decommissioned. The transmission line and site boundary are identified in the enclosed maps.

The U.S. Fish and Wildlife Service and the State of New Jersey were involved in the siting of the new transmission line south of OCNGS owned by Connectiv. This new line is outside the scope of NRC's license renewal review.

To support the environmental impact statement preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of OCNGS and its associated transmission line right-of-way. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

The NRC staff plans to two public NEPA scoping meetings on November 1, 2005, at the Quality Inn located at 815 Route 37 in Toms River, New Jersey. You and your staff are invited to attend the public meetings. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. Your office will also receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is June 2006.

Appendix E

C. Day

-3-

If you have any questions concerning OCNGS, the license renewal application, or other aspects of this project, please contact the NRC's Senior Environmental Project Manager, Dr. Michael Masnik, at (301) 415-1191 or by e-mail at MTM2@nrc.gov.

Sincerely,



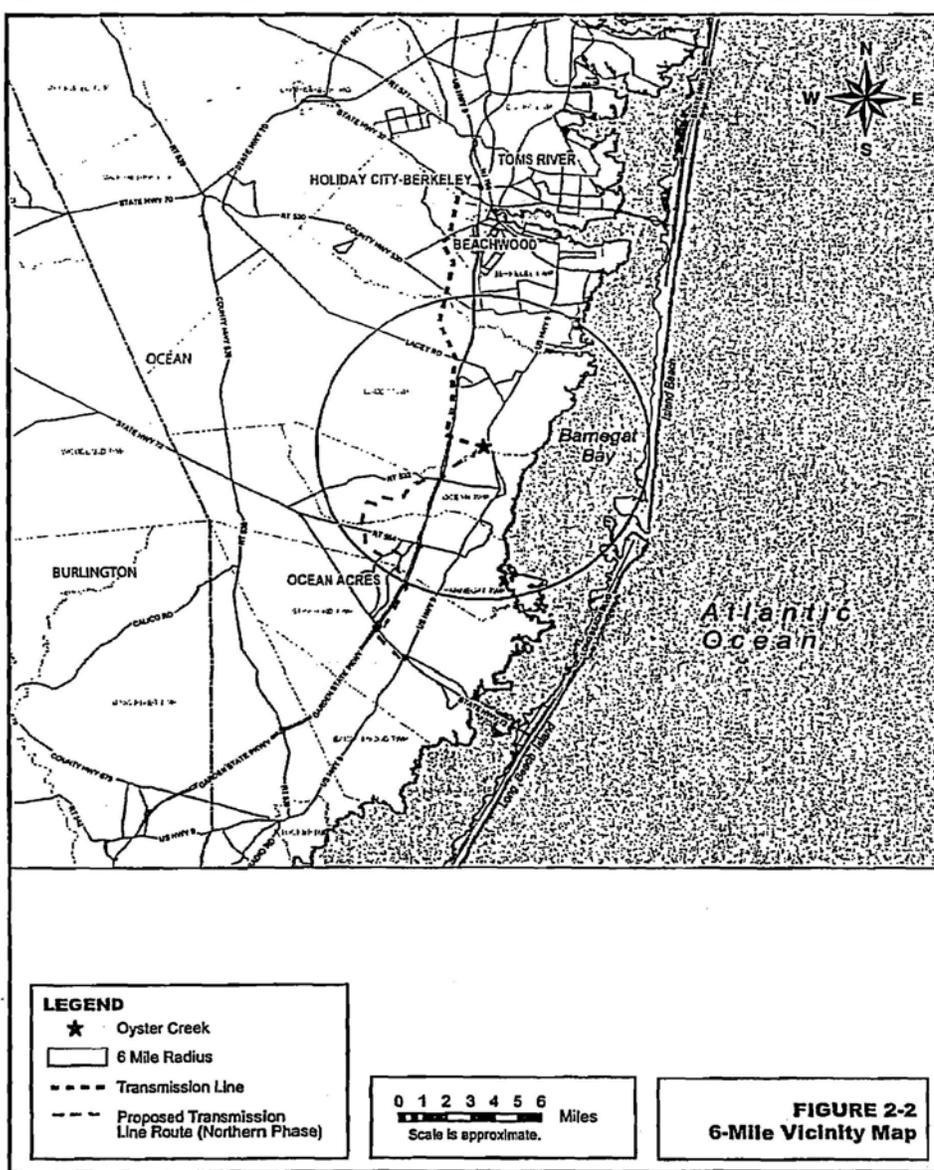
Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

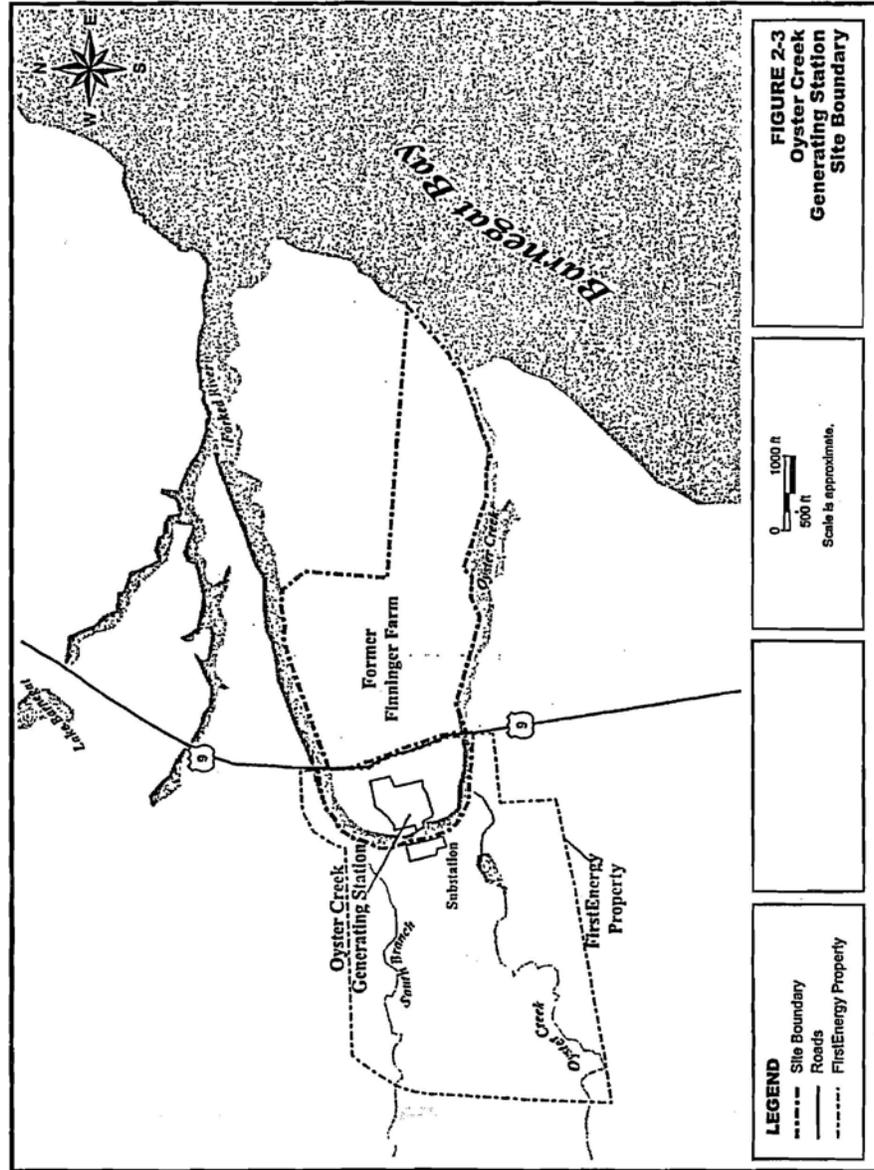
Docket No.: 50-219

Enclosures: As stated

cc w/encl.: See next page

Environmental Report
Section 2.1 Figures







UNITED STATES
NUCLEAR REGULATORY COMMISSION
 WASHINGTON, D.C. 20555-0001

October 12, 2005

Ms. Dorothy Guzzo
 State Historic Preservation Officer
 Historic Preservation Office
 P.O. Box 404
 Trenton, NJ 08625-0404

**SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION LICENSE RENEWAL
 REVIEW (TAC NO. MC7625) (HPO-J2004-7021)**

Dear Ms. Guzzo:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating license for Oyster Creek Nuclear Generating Station (OCNGS), which is located in Lacey Township in Ocean County, New Jersey. The nearest major metropolitan areas to OCNGS include Newark, New Jersey, approximately 60 miles to the north; Atlantic City, New Jersey, approximately 35 miles to the south; and Philadelphia, Pennsylvania, approximately 60 miles west of the OCNGS site. OCNGS is owned and operated by AmerGen Energy Company, LLC (AmerGen). The application for renewal was submitted by AmerGen on July 22, 2005, pursuant to the requirements of Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) augmenting its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC regulation that implements the National Environmental Policy Act (NEPA) of 1969, as amended. In accordance with 36 CFR 800.8, the SEIS will include analyses of potential impacts to historic and archaeological resources.

In the context of the National Historic Preservation Act of 1966, as amended, the NRC staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license-renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post-license-renewal land-disturbing operations or projected refurbishment activities, specifically related to license renewal, may have a potential effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest.

While preparing its application, AmerGen contacted your office by letter dated October 7, 2004. In that letter, AmerGen stated that it has no plans to alter current operations or engage in any land-disturbing activities during the license renewal period, and therefore, it does not expect the operation of OCNGS through the license renewal term to affect adversely cultural or historic resources at the plant or its immediate environs. Your office responded by letter dated October 15, 2004, stating that no historic properties listed on or eligible to be listed on the National Register of Historic Places would be affected by the proposed action.

Appendix E

D. Guzzo

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On November 1, 2005, the NRC will conduct two public scoping meetings at the Quality Inn located at 815 Route 37 in Toms River, New Jersey. You and your staff are invited to attend. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is June 2006. If you have any questions or require additional information, please contact the NRC's Senior Environmental Project Manager, Dr. Michael Masnik, at 301-415-1191 or by e-mail at MTM2@nrc.gov.

Sincerely,



Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-219

cc: See next page



UNITED STATES
NUCLEAR REGULATORY COMMISSION
 WASHINGTON, D.C. 20555-0001

October 12, 2005

Patricia A. Kurkul, Regional Administrator
 NOAA's National Marine Fisheries Service
 Northeast Regional Office
 One Blackburn Drive
 Gloucester, MA 09130-2298

**SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES AND ESSENTIAL FISH
 HABITAT WITHIN THE AREA UNDER EVALUATION FOR OYSTER CREEK
 NUCLEAR GENERATING STATION LICENSE RENEWAL**

Dear Ms. Kurkul:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application submitted by AmerGen Energy Company, LLC (AmerGen) for the renewal of the operating license for the Oyster Creek Nuclear Generating Station (OCNGS). OCNGS is a single-unit nuclear plant located in Lacey Township in Ocean County, New Jersey. As part of the review of the license renewal application, the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of the National Environmental Policy Act (NEPA) of 1969, as amended. The SEIS includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to marine resources and habitat. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, the Fish and Wildlife Coordination Act of 1934, as amended, and the Sustainable Fisheries Act of 1996.

AmerGen stated that it has no plans to alter current operations over the license renewal period and that OCNGS operating under a renewed license would use existing plant facilities and transmission lines and would not require additional construction or disturbance of new areas. Any maintenance activities would be limited to previously disturbed areas.

OCNGS is situated on approximately 800 acres of land in the coastal pine barrens of New Jersey approximately 9 miles south of Toms River, New Jersey. The property is on the western shore of Barnegat Bay. East of U.S. Highway 9 the northern site boundary is the South Branch of Forked River, and the southern site boundary is Oyster Creek. West of U.S. Highway 9 the site boundary is defined by the manmade intake and discharge canals (See Enclosed Maps).

OCNGS employs a once-through heat dissipation system designed to remove waste heat from the condensers. The circulating water system includes the intake canal, an intake structure divided into two bays, circulating water pumps, condensers, dilution pumps, discharge pipes, and discharge canal. The purpose of the dilution pumps is to decrease the attractiveness of the heated discharge to migratory marine species during the spring and fall, and to reduce thermal stress on organisms in the discharge canal during the summer. An angled boom in the intake canal immediately in front of the intake prevents large mats of eelgrass and algae from clogging the intake system. Barnegat Bay is the plant's cooling water source and heat sink. Cooling water is drawn from Barnegat Bay through the South Branch of Forked River and into a

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P. Kurkul

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150-foot-wide intake canal dredged to a depth of 10 feet. The circulating water is returned to the 150-foot-wide discharge canal and from there flows to Oyster Creek and back to Barnegat Bay. Depths in the South Branch of the Forked River, canals, and lower reaches of Oyster Creek are maintained by periodic dredging.

The transmission lines in the scope of NRC's environmental review for license renewal are those that were originally constructed for the specific purpose of connecting the plant to the transmission system. A single 230-kilovolt transmission line was built to connect OCNGS to the electric grid. It is a double circuit line hung on a single set of towers that runs 11.1 miles from the OCNGS 230 kilovolt Substation to the Manitou Substation near Toms River. Beyond the OCNGS substation transformer-side disconnects, the line is owned and operated, and corridor easements held, by FirstEnergy, an Ohio utility. The transmission line corridor is 240 feet wide and approximately parallels the New Jersey State Parkway, occupying about 320 acres. The corridor passes through land that is primarily pine forest and swamp forest. Approximately 1 mile of the line passes through Double Trouble State Park. The line is in Ocean County and crosses numerous county roads and the New Jersey State Parkway. FirstEnergy plans to maintain this transmission line, which is integral to the larger transmission system, indefinitely. The transmission line will remain a permanent part of the transmission system after OCNGS is decommissioned. The transmission line and site boundary are identified in the enclosed maps.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests a list of endangered, threatened, candidate, and proposed species, and designated and proposed critical habitat under the jurisdiction of the National Marine Fisheries Service that may be in the vicinity of the OCNGS site and its transmission line corridors. The most recent formal consultation for the continued operation of OCNGS was completed on September 22, 2005. However, this letter requesting consultation relates specifically to the NRC's review of AmerGen's license renewal application for OCNGS.

In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act. Also in support of the SEIS preparation and to ensure compliance with Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act, the NRC requests a list of essential fish habitat that has been designated in the vicinity of the OCNGS site and its associated transmission line corridors.

The NRC staff plans to hold two public NEPA scoping meetings on November 1, 2005, at the Quality Inn located at 815 Route 37 in Toms River, New Jersey. You and your staff are invited to attend the public meetings. The first session will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second session will convene at 7:00 p.m., with a repeat of the overview portions of the meeting, and will continue until 10:00 p.m., as necessary. Your office will also receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is June 2006.

P. Kurkul

- 3 -

If you have any questions concerning OCNCS, the license renewal application, or other aspects of this project, please contact the NRC's Senior Environmental Project Manager, Dr. Michael Masnik, at 301-415-1191 or by e-mail at MTM2@nrc.gov.

Sincerely,



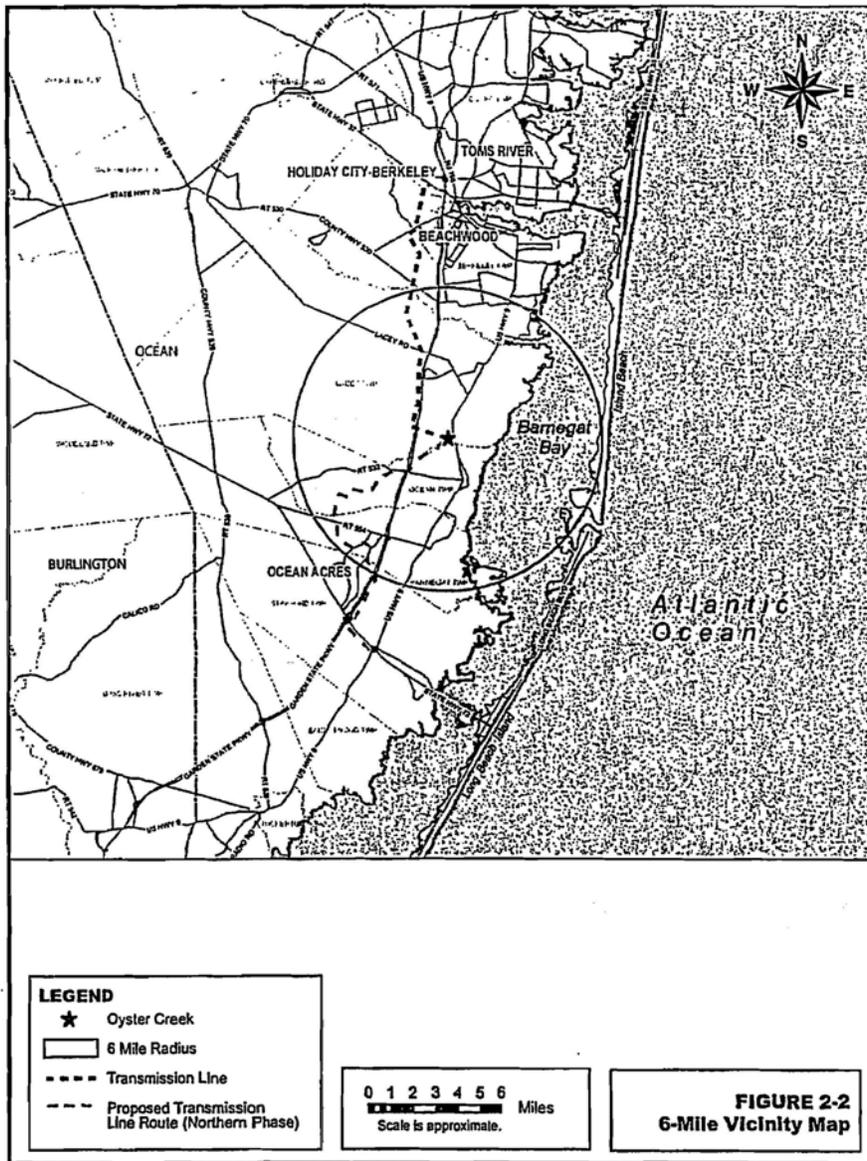
Pao-Tsin Kuo, Program Director
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Office of Nuclear Reactor Regulation

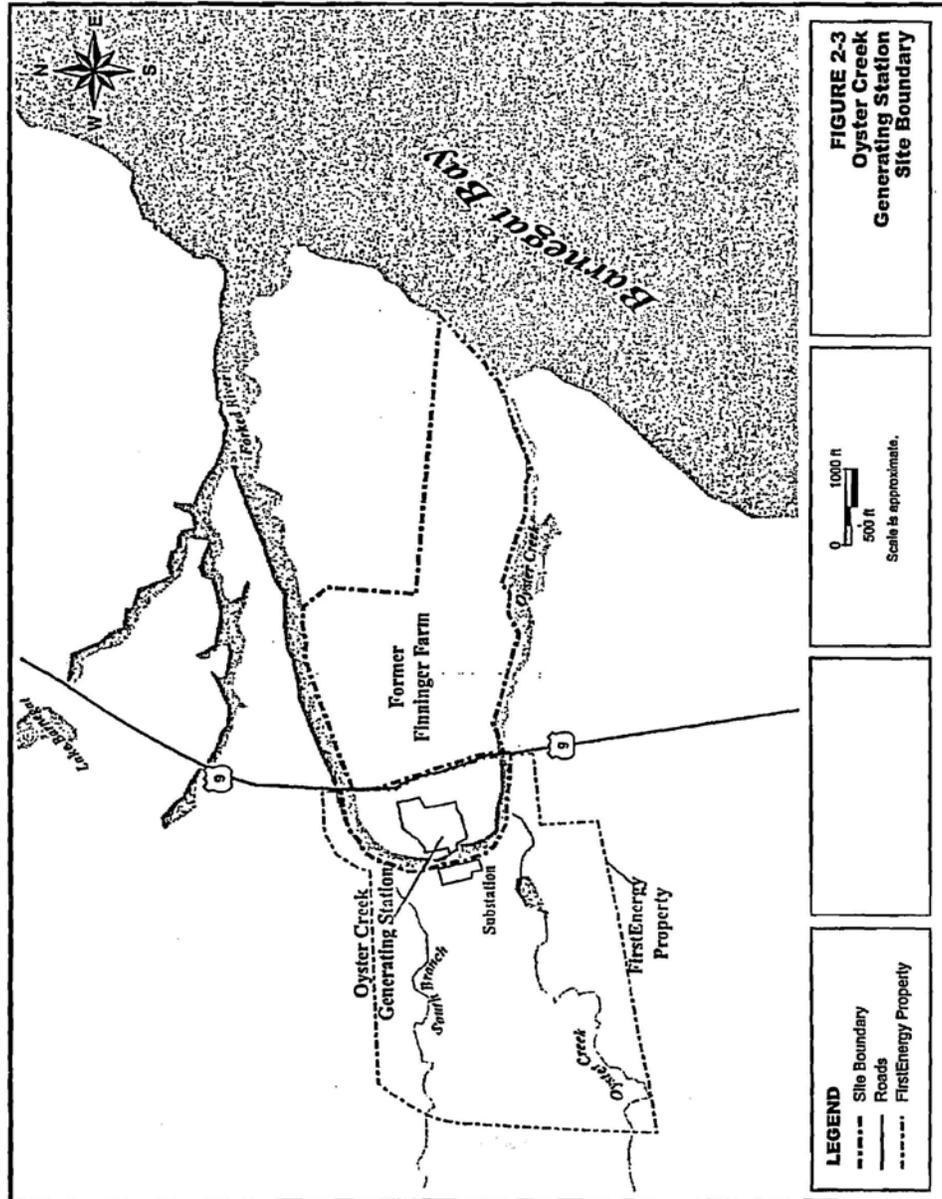
Docket No.: 50-219

Enclosures: As stated

cc w/encls.: See next page

Environmental Report
Section 2.1 Figures





Appendix E

From: "Deborah Fimbel" <Deborah.Fimbel@dep.state.nj.us>
To: <MTM2@nrc.gov>
Date: 11/2/05 3:50PM
Subject: Oyster Creek Nuclear Generating Station license renewal and invitation to public scoping meeting

Dr. Masnik -

Our Office administrator, Dorothy Guzzo, has received a letter from Pao-Tsin Kuo inviting us to join you at the November 1st, 2005 public scoping meeting in Toms River, NJ for the Oyster Creek Nuclear Generating Station license renewal. As noted in the letter, Ms. Guzzo responded on October 15th, 2004 that the project re-licensing will not impact historic and archaeological properties. Therefore, we will not consult further at this time.

We are aware that limited off-site new activities may potentially become part of the project, and that there may be modification to on-site facilities as well. If project activities beyond re-licensing do occur, we look further to further consultation under Section 106 of the National Historic Preservation Act.

Thank you for the invitation to the public scoping meeting. If you have any questions, please contact me. Deborah Fimbel

Deborah Rinker Fimbel
Principal Historic Preservation Specialist
Historic Preservation Office NJDEP
501 East State Street P.O. Box 404
Trenton, New Jersey 08625-0404
(609) 984-6019 FAX (609) 984-0578
Deborah.Fimbel@dep.state.nj.us
www.state.nj.us/dep/hpo

2005 Conference of the Council for
Northeast Historical Archaeology
Cities Built on Commerce & Industry
October 20-23, 2005 in Trenton, NJ

For additional information, please see
<http://www.smcm.edu/Academics/soan/cneha/home.htm>



In Reply Refer to:

United States Department of the Interior

FISH AND WILDLIFE SERVICE



New Jersey Field Office
Ecological Services
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609/646 9310
Fax: 609/646 0352
http://njfieldoffice.fws.gov

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Michael T. Lesar, Chief
Rules and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop T-6D59, U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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RULES AND DIRECTIVES
BRANCH
USFWS

Dear Mr. Lesar:

The U.S. Fish and Wildlife Service (Service) has reviewed the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) and to conduct a scoping process for the license renewal of the AmerGen Energy Company, LLC (AmerGen) (applicant) Oyster Creek Nuclear Generating Station, in the Township of Forked River, Ocean County, New Jersey. The project is located on the South Branch of the Forked River and on Oyster Creek, two waterways that discharge into Barnegat Bay. The following comments also reflect an assessment of a report entitled "Applicant's Environmental Report - Operating License Renewal Stage, Oyster Creek Generating Station" (undated).

INTRODUCTION

AmerGen has submitted an application to the Nuclear Regulatory Commission (NRC) to continue operation of its Oyster Creek Nuclear Generating Station for an additional 20 years (the applicant's preferred alternative). The nuclear plant has been in operation since 1969, and its license is due to expire on April 9, 2009. On October 11 through 13, 2005, the Service attended several interagency scoping meetings with the applicant, the NRC, and representatives from the New Jersey Department of Environmental Protection (NJDEP) to discuss the project, current adverse impacts to fish and wildlife resources, and potential plant modifications and other mitigative measures that could offset these impacts. Currently, the power plant withdraws approximately 1.25 billion gallons of water per day from Barnegat Bay to aid in cooling the nuclear reactor. The intake of cooling water entrains and entraps an unknown quantity of aquatic biota from Barnegat Bay. Prior to the scoping meetings, the Service concluded with AmerGen on January 25, 2005 that the continued operation of the plant until 2029 would not adversely affect federally listed threatened and endangered species under Service jurisdiction.

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template = ADM-013

E-RDS = ADM-03

Call = M. Masarik (MTM2)

AUTHORITY

The following comments on the proposed activity are provided pursuant to the National Environmental Policy Act of 1969 (83 Stat. 852; 42 U.S.C. 4321 *et seq.*) (NEPA), Migratory Bird Treaty Act of 1918 (40 Stat. 755, as amended; 16 U.S.C. 703-712), and Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA), and do not preclude future comments pursuant to the NEPA on a Draft EIS or to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) regarding review for federal permit or license. The following comments are consistent with the intent of the Service's Mitigation Policy (Federal Register Vol. 46, No. 15, Jan. 23, 1981), which emphasizes that avoidance and minimization precede compensation, which is to be considered for unavoidable adverse impacts to fish and wildlife resources and supporting ecosystems.

GENERAL COMMENTS

The Service appreciates the opportunity to participate in the early planning of this project. The above-referenced 3-day interagency meetings allowed the regulatory and resource agencies and the applicant to discuss impacts to fish and wildlife resources. The Service offers the following comments and concerns to assist in project planning and for use in the NRC's NEPA document (EIS). These comments also reflect an assessment of the applicant's Environmental Report. The Service recommends that the following concerns, including the development of a mitigation plan, be resolved prior to completing the Draft EIS.

SPECIFIC COMMENTS

1. Federal Listed Species

As discussed in the Service's January 25, 2005 letter to AmerGen, except for an occasional transient bald eagle (*Haliaeetus leucocephalus*), no other federally listed or proposed threatened or endangered species under the Service jurisdiction are known to occur within the project area. Therefore, the Service concluded that the proposed project would not adversely affect federally listed species under Service jurisdiction.

Due to the recent nesting successes of bald eagles in New Jersey, a possibility exists that a pair of eagles could nest on or adjacent to the project area in New Jersey during the NRC's regulatory review or during the life of the renewed license (if approved). The NRC and AmerGen were notified at the above scoping meetings of the possibility of future eagle nesting. Should nesting occur in the project area during the NRC re-licensing process or during the life of any renewed license, additional consultation pursuant to Section 7 of the ESA would be necessary. We recommend that the NRC obtain a status update of the bald eagle prior to its approval of any license renewal.

The Service also recommended (not required) in its January 25 letter, that AmerGen retain a qualified botanist to conduct a survey to determine the presence of any rare plants, including the federally listed Knieskern's beaked-rush (*Rhynchospora knieskernii*) and swamp pink (*Helonias bullata*), and the federal candidate bog asphodel (*Nartheccium americanum*) in the project area.

These species have been documented within 1.5, 2.8, and 1.3 miles (respectively) of the project area. Since re-licensing is not expected to impact project area wetlands, the Service recommended, rather than required, a botanical survey. To date, the Service is unaware of any botanical survey conducted in the project area. Surveys for the above species would be necessary if any project alternatives or mitigative measures were to involve project area wetlands that might support these species.

No further consultation pursuant to Section 7(a) (2) of the ESA is required with the Service at this time. If project plans change (e.g., to involve project area wetlands) or if new information is obtained that indicates the occurrence of a federally listed species at the proposed project site(s), this determination may be reconsidered. The Service provides the above determination with respect to federally listed or proposed threatened or endangered flora and fauna under the Service jurisdiction only. The proposed project is located on Barnegat Bay and may affect federally listed marine turtles. Principal responsibility for threatened and endangered marine species is vested with the National Marine Fisheries Service (NMFS). We understand that the NRC has begun formal Section 7 consultation with the NMFS. This consultation should be completed prior to the NRC's issuance of the Draft EIS.

2. State Listed Species

The Service recommends that the NRC and the applicant continue working with the NJDEP to protect State-listed species and to obtain any other recommendations to modify plant operations to protect resources of State concern. Any mitigation plans should be developed prior to completing the Draft EIS. In addition, any botanical surveys conducted in the project area should include State-listed species.

3. National Environmental Policy Act

a. Project Purpose and Need

Under the NEPA, "purpose" and "need" are closely linked but subtly different. "Need" may be thought of as the problem and "purpose" as an intention to solve the problem. Clear statements of purpose and need are the basis for (1) identifying reasonable and practicable alternatives, (2) analyzing those alternatives in depth, and (3) selecting the preferred alternative.

The Service requests that the NRC demonstrate a public need for the continued operation of the Oyster Creek Nuclear Generation Station. Specifically, we request additional information on the current and projected electrical needs of the applicant's service area and whether other alternative sources of electricity are available, that could meet this need. The Service understands that the electrical transmission capability in New Jersey is deficient but growing and that the importation of electricity from other Northeast states and Canada could meet the public's need without the continuation of the Oyster Creek nuclear power facility. The Service has also obtained information from Conectiv Power, owner of one of the transmission lines that terminates at the applicant's substation, that "there is very significant electric generation available from existing power plants to meet that growth" (ENSR International, 2004). It appears that transmission capability and not generation is the most critical component to meeting the public's need for electricity. In addition, the applicant states in its

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Environmental Report (page 7-11) that the “construction of new transmission lines could be required to ensure system reliability.”

The NRC Draft EIS should discuss the interrelationship between available transmission capability and electrical generation. This discussion should include several new transmission line upgrades recently constructed or planned in New Jersey and other sources of generated electricity from the Northeast that could meet the current and projected public need. The Service also recommends that the Draft EIS reflect that the Conectiv 230-kV transmission line is active. The applicant’s Environmental Report on page 3-6 states that the line has not been constructed.

b. Alternatives Analysis

The applicant has identified its preferred alternative as renewal of its operating license for an additional 20 years, without any plant modifications. The Service recommends that the applicant re-consider in its alternatives analysis the value to the aquatic environment of constructing a closed-loop cooling system or the employment of other project features (see below) that are designed to avoid or minimize adverse impacts to the aquatic environment. For example, the use of a closed-loop system would reduce intake cooling water volumes, when compared to the preferred alternative, by 90 percent (see the applicant’s Environmental Report page 7-19). Such an alternative would avoid many of the adverse environmental impacts that are currently occurring to the aquatic biota of Barnegat Bay (*i.e.*, entrapment, entrainment, and thermal impacts).

The continued operation of the Oyster Creek Nuclear Generating Station poses individual and cumulative impacts on the human environment. The continued use of 1.25 billion gallons of water per day from Barnegat Bay represents an adverse impact to the bay’s aquatic biota. The Service does not concur with the applicant’s conclusion that the impacts associated with its proposed 20-year license renewal would be small and do not warrant mitigation (see page 6-4 or the applicant’s Environmental Report). The intake velocities for plant cooling may approach 5.0 feet per second (fps). These velocities exceed the 0.5 fps criteria established for intake structures by the State (New Jersey Division of Fish, Game and Wildlife, undated). The U.S. Environmental Protection Agency’s (EPA) establishment of a 0.5 fps velocity for all new cooling water intake structures that draw from rivers, streams, or ocean waters of the United States (40 CFR Part 125.84 [b][2]) is consistent with the State’s requirements. Velocities of intake water that exceed 0.5 fps promote adverse impacts to aquatic resources due to entrapment or entrainment.

The Service recommends that the Draft EIS also include consideration of the following project features as a means to avoid or minimize impacts to the aquatic environment: placement of additional screening/netting or other project features (*e.g.*, bubble or sound deterrent systems) in the intake canal closer to Barnegat Bay; employment of flow reduction options during low peak demands; construction of a large water impoundment or recirculation structure on the Finnengar’s Farm to supplement the plant’s cooling water needs; or a combination of any of the above.

c. Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when

added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR Part 1508.7).

The NRC’s Draft EIS should document the adverse cumulative impacts that are occurring to the bay’s aquatic biota from thermal impacts (cold-water shock and heated water, as discussed below) and from entrapment or entrainment from passing through the circulation and dissipation pumps. Because the data discussed in the applicant’s Environmental Report are dated, it is difficult to ascertain the present level of cumulative adverse impacts. In addition, the NRC must consider the cumulative effects on the bay’s aquatic environment due to other actions such as mortality from recreational and commercial fishing. Without more relevant biological data on species use of the project area, the Service must conclude that cumulative impacts to the environment are more than minimal. Without meaningful biological data, the NRC’s Draft EIS should also conclude that cumulative adverse impacts would continue to occur with the applicant’s preferred alternative (license renewal), warranting substantial measures for compensatory mitigation.

d. Aquatic Impacts

When an agency is evaluating reasonable significant adverse effects on the human environment in an EIS, and information is incomplete or unavailable, the agency shall determine the reasonableness of including that information in an EIS (40 CFR Part 1502.22).

The Service recommends that the NRC postpone the issuance of its Draft EIS (June 2006) until additional ongoing biological studies (which began recently) are completed and information is available to assess plant operational effects on fish and wildlife resources. The results of these studies are essential for assessing potential adverse environmental impacts to the aquatic environment. The overall cost of obtaining this information is not exorbitant, as defined in 40 CFR Part 1502.22 (a) and is necessary to fulfill NEPA responsibilities to adequately assess individual and cumulative impacts (see cumulative effects discussion below). Information from the biological studies will yield, at a minimum, biomass losses of finfish and crustaceans from the applicant’s plant operation and projected adverse impacts to the aquatic environment if the license is renewed.

The applicant’s Environmental Report uses biological data derived from a 12-year period (1965 to 1977), to describe aquatic biota found in the project area; however, the age of the data (28 years) limits its value for assessing current and reasonably foreseeable future impacts. The applicant’s assertion that the impacts of entrainment of fish and shellfish are “small” (page 4-9) cannot be supported adequately with data that are most likely outdated. In addition, the assertion that impacts are small appears to contradict later statements in the applicant’s Environmental Report that numerous unavoidable adverse impacts to the aquatic environment are occurring (page 6-5).

The plant utilizes 1.25 billion gallons of water each day for cooling. Water from Barnegat Bay enters the Forked River, passes through several small, mesh screens and large circulating or dissipating pumps, is heated upwards of 24 degrees Fahrenheit as it passes through the heat dissipation chamber, and is then released into Oyster Creek, eventually flowing back into the bay. This cooling water entraps and entrains an unknown amount of aquatic biota, including

egg, larvae, juvenile, and adult finfish and crustaceans. The NJDEP (2005) reported that the Forked River drainage area provides habitat for river herring. The same report indicated that the Upper Branch of the Forked River had a herring spawning run, which no longer exists due to the combined effects of pollution, habitat displacement, man-made water course blockages, and over-fishing. Although not mentioned in the NJDEP report, it appears that Oyster Creek, just south of the Forked River drainage area, may have also lost a herring spawning run after a dam was built on the creek in the 1960s for the purpose of storing water for fire fighting capability at the nuclear plant. The proximity of the Forked River to the plant cooling intake structures makes it likely that any egg larvae or young-of-the-year herring originating from Forked River will pass through the plant's cooling system and be killed before entering Barnegat Bay.

Significant population changes have also occurred to several commercial and recreationally important finfish and shellfish species found in Barnegat Bay since the conclusion of the 12-year biological sampling study in 1977. The population of the hard clam (*Merceneria mercenaria*) and winter flounder (*Pseudopleuronectes americanus*) have dropped precipitously and the localized effects of the intake of over 1 billion gallons of water per day on these two species are unknown. In addition, the Atlantic Coast population of the striped bass (*Marone saxatilis*) has risen sharply from the mid-1980s. Striped bass and other marine species are known to utilize the intake and discharge areas of the project, but the extent of their use is unknown. The economic value of recreational fishing in New Jersey is high (see discussion on public access and recreation below). The effect of the discharge of hot water is unknown on recreational sport fish and other aquatic species. In addition, there have been several confirmed large fish kills due to cold water shock from winter plant closings. The NRC Draft EIS should document these fish kills and discuss the cumulative impacts of these kills in view of the data and available information concerning the aquatic biota that is entrapped on the cooling water intake structures or entrained in the heat dissipation chamber.

Because of the concerns outlined above, the Service recommends expansion of the current biological sampling study to a minimum of 3 years. A 3-year study would allow the NRC to more adequately determine what effects, if any, the plant's operation is having on aquatic biota. Obtaining this information does not appear to be cost prohibitive. The Service also recommends review of the current sampling method by the NJDEP, NMFS, Service, and other interested parties to ensure that information gathered will be adequate for assessing impacts to aquatic biota associated with plant operation. The Service also recommends collection of biological data for the life of the license in order to demonstrate that adverse impacts remain minimal over time. The license should contain conditions to require additional mitigation (see the discussion of mitigation below) should post-license data analysis confirm that additional or unforeseen adverse impacts are occurring.

e. Terrestrial Impacts

The applicant does not propose any new construction activities with the license renewal. However, during the inter-agency meetings noted above, the Service learned that a substantial amount of previously contaminated dredged material, stored in a confined disposal facility (CDF) just east of the plant on the Finnenger's Farm property, may require remediation and/or removal to an approved upland facility. A site visit revealed that the farm consists of several abandoned fields; an early successional

forest, including some maritime forest species; and pockets of both tidal and non-tidal wetlands. These types of vegetative cover provide valuable habitats for upland wildlife species. New construction activities (e.g., clearing and grubbing of upland vegetation, upgrading roads, or the construction of an offloading barge facility in Oyster Creek) would be expected if the CDF requires remediation or removal and would impact terrestrial species that utilize the farm. Therefore, the Service recommends clarifying any activities proposed on the Finnenger's Farm in the Draft EIS, including construction methods for any remediation of the CDF.

f. Mitigation

The CEQ requires inclusion of means to mitigate adverse environmental impacts in the EIS discussion of environmental consequences, if not covered in the description of the proposed action or alternatives (40 CFR Part 1502.16[h]). In addition, a mitigation plan (when necessary) is generally required prior to project authorization by the NJDEP. Therefore, the Service recommends that the NRC develop a mitigation plan for the proposed license renewal and discuss the plan in the Draft EIS. The mitigation plan should be developed in consultation with the NMFS, Service, and NJDEP and identify proposed means to avoid, minimize, and compensate (in that order) all adverse environmental effects on fish and wildlife resources. Consistent with the Service's Mitigation Policy, all in-kind options should be exhausted before considering out-of-kind mitigation. For example, the Service is aware that the NJDEP is considering restoration of several large wetland areas as potential mitigation. Although the Service encourages wetland restoration in most cases, this should only be employed as out-of-kind mitigation after the applicant has exhausted other direct compensatory options for adverse impacts to aquatic organisms (*i.e.*, the removal of fish blockages for river herring or the development of long-term hard clam or other finfish or shellfish restoration projects).

During the October 11-13 interagency scoping meeting, the Service learned that a dam and pond were constructed just below the headwaters of Oyster Creek to store water for fire fighting capability at the plant. From a review of pre-1969 construction aerial photographs of the pond, it appears that Oyster Creek was a functioning waterway capable of supporting fish passage and possibly spawning habitat. Oyster Creek has the potential to offset expected adverse impacts from the proposed license renewal via the construction of a fish ladder. The Service can assist the NRC in identifying other potential fish ladder projects as potential mitigation for the preferred alternative.

OTHER SERVICE CONCERNS

1. Public Access and Recreation

Recreational fishing is a \$35 billion industry for the nation, with approximately 900,000 New Jersey recreational anglers expending nearly \$700 million annually for fishing tackle and other related purchases (U.S. Fish and Wildlife Service and U.S. Census Bureau, 2002). A key component to these economic benefits is unimpeded public access. A federal excise tax is collected from manufacturers of fishing equipment, as well as a portion of the federal fuel tax that is attributed to motorboat usage. Revenue is passed on to participating states. Since 1950, the Service's Federal Aid in Sport Fish Restoration Program has provided funds to state fish and wildlife agencies. The funding is used to restore, conserve, manage, and enhance fish species that are sought by recreational anglers, fund educational programs to enhance the public's understanding of aquatic resources and recreational

fishing, and to promote the development of responsible attitudes and ethics toward the aquatic environment.

Currently, recreational anglers fish in areas downstream of the hot water effluent in Oyster Creek. However, the public access points in this area are limited to the State Route 9 Bridge and several small shoreline areas. The Service recommends that the NRC work closely with the applicant, the NJDEP, and interested recreational fishing organizations to develop a comprehensive public access plan that would better address the recreational needs in the project area. A recreational use and access plan would be consistent with public access policies and regulations (Coastal Zone Management Act of 1972 (86 Stat. 1280; 16 U.S.C. 1451-1464). The Service is available to assist in the development of a public access plan.

2. Best Management Practices

The Service also recommends that, in association with implementing best management practices (BMPs), the NRC include provisions to control the spread of invasive species, such as *Phragmites australis* in the transmission line right-of-ways and the CDF on the Finnengar's Farm.

A draft Management Plan by the Chesapeake Bay Program's *Phragmites australis* Working Group (2003) includes recommendations to curb the spread of *Phragmites* through federal and state permit conditions, in order to help achieve a long-term goal of no net gain in *Phragmites* acreage. The Service has subsequently recommended initiation of a similar planning effort to control *Phragmites* in the Hackensack Meadowlands in Bergen and Hudson Counties, pursuant to Executive Order 13122 and under the auspices of the National Invasive Species Council. The Service recommends a similar program in the project area, including the two power line right-of-ways maintained by Conectiv and FirstEnergy and the CDF, with participation of the NRC. In the interim, the Service recommends that any federal authorization resulting in wetland disturbance (*e.g.*, power line right-of-way maintenance, dredging, or excavation of the CDF) include conditions requiring: (1) BMPs to prevent the introduction or spread of invasive species, such as avoiding creation of elevated berms and the spread or burial of *Phragmites* rhizomes; (2) 2 to 5 years of post-construction monitoring to detect the introduction or spread of invasive species, and (3) control efforts, if *Phragmites* or another invasive species are detected (to include re-grading or hydrologic corrections for any construction-related disturbances that promote the spread of *Phragmites*, if other control methods [*i.e.*, herbicides] prove insufficient in the long-term).

SUMMARY AND RECOMMENDATIONS

The Draft EIS should thoroughly address the purpose and need for the proposed action, alternatives and project viability. In addition, fish and wildlife issues must be adequately addressed pursuant to the NEPA, in determining direct, indirect and cumulative adverse impacts to fish and wildlife resources, and mitigation for unavoidable adverse impacts must be developed. In summary, the Service recommends that the NRC:

1. Obtain a status update of the bald eagle prior to any license renewal and conclude consultation with the NMFS regarding listed species under NMFS jurisdiction.

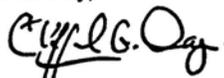
2. Conduct a survey to determine the presence of any federally listed or other rare species of plants, especially if any project area wetlands are evaluated as potential mitigation sites.
3. Continue coordinating with the NJDEP to protect State-listed species, and to obtain any other recommendations to modify plant operations to protect resources of State concern. Include State-listed species in any botanical surveys of the project area.
4. Provide further clarification regarding the need for the project in view of improved electrical transmission capacity in the Northeast and Canada. Include a discussion on the interrelationship between available transmission and electrical generation capability throughout the Northeast.
5. Confirm in the Draft EIS that the Conectiv 230-kV transmission line was constructed.
6. Evaluate other alternatives to obtain cooling water for the nuclear reactor, including the use of a closed-loop cooling system and constructing a large water impoundment or recirculating structure on Finnengar's Farm. Evaluate measures to minimize adverse impacts from the preferred alternative, reducing the need for cooling water during low peak usage, using additional fish screening closer to Barnegat Bay, and using bubble or sound deterrent systems to eliminate impacts to aquatic organisms.
7. Document in the Draft EIS all aquatic biota mortality attributable to plant operation, including but not limited to organisms entrapped, passing through the cooling chamber or dissipation pumps, or killed by thermal shock.
8. Postpone the issuance of the Draft EIS until completion of a 3-year biological study. Existing biological data are outdated and no longer reliable for assessing individual or cumulative adverse impacts to the aquatic environment. Please submit the aquatic biota sampling protocols to the Service, NMFS, and NJDEP for review. As noted, the sampling period should be expanded to 3 years.
9. Clarify statements made in the applicant's Environmental Report that impacts to the aquatic environment are small. The same report notes that unavoidable adverse impacts are occurring.
10. Collect biological data for the life of any approved license to demonstrate that future potential adverse impacts are no more than minimal.
11. Discuss the removal of contaminated dredged material from the CDF found on the Finnengar's Farm and specify any activities proposed.
12. Develop a mitigation plan with the Service, NMFS, and NJDEP to compensate for unavoidable adverse impacts prior to completion of the Draft EIS and for unforeseen impacts that may develop over the term of the license if renewed.
13. Develop a public access plan to address the recreational needs in the project area.

Appendix E

14. Develop BMPs for all construction activities and include provisions to control the spread of invasive species and monitoring with remedial provisions to ensure success.

The Service appreciates the opportunity to comment on the NOI and the applicant's Environmental Report. We recommend that the NRC continue close coordination with the Service and the NJDEP to ensure that fish and wildlife concerns are comprehensively addressed during preparation of the Draft EIS. Please keep us informed of your actions regarding the development of the Draft EIS. Mr. John Staples or Mr. Steve Mars of my staff are available to answer any questions on the content of this letter. They are available at (609) 646-9310, extensions 12 and 23, respectively.

Sincerely,



Clifford G. Day
Supervisor

REFERENCES

- Chesapeake Bay *Phragmites australis* Working Group. 2003. Common reed (*Phragmites australis*) in the Chesapeake Bay: a draft bay-wide management plan. U.S. Department of the Interior, Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, Maryland. 30 pp. (Available online at <http://www.chesapeakebay.net/pubs/calendar/1NISW 2-10-3 Report 4 5129.pdf>)
- ENSR International. 2004. Environmental Assessment prepared for the U.S. Fish and Wildlife Service for Land Exchange with Conectiv Power Delivery involving the Edwin B. Forsythe National Wildlife refuge, Galloway Township, Atlantic County, New Jersey. ENSR International Langhorn, Pennsylvania. 53pp. + Appendices.
- New Jersey Department of Environmental Protection. 2005. Locations of anadromous American shad and river herring during their spawning period in New Jersey's freshwaters including known migratory impediments and fish ladders. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Freshwater Fisheries, Sicklerville, New Jersey.
- New Jersey Division of Fish, Game, and Wildlife. Undated. Basic criteria for intake structures. New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Bureau of Freshwater Fisheries, Trenton, New Jersey.
- U.S. Fish and Wildlife Service and U.S. Census Bureau. 2002. 2001 National survey of fishing, hunting, and wildlife-associated recreation. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. and U.S. Department of Commerce, Census Bureau, Washington D.C. p.120 of 170 pp. (Available online at <http://www.census.gov/prod/2002pubs/FHW01.pdf>)

P. Kurkul

-2-

OCNGS operations for 1 species, and the remaining 13 species could experience a minimal adverse effect on their EFHs. Although once-through cooling systems are thought to have a substantial adverse effect on EFH due to the withdrawal of water, the NRC staff has determined that continued operation of the OCNGS cooling system, with its existing mitigation measures, is expected to have a minimal adverse effect on EFH.

We are requesting initiation of an EFH consultation. In reaching our conclusion, the NRC staff relied on information provided by the applicant, on research performed by NRC staff, and on information from National Marine Fisheries Service. If you have any questions regarding the enclosed draft SEIS, the EFH Assessment in Appendix E of the SEIS, or the staff's request, please contact Dr. Michael Masnik, Senior Environmental Project Manager, at 301-415-1191 or by e-mail at mtm2@nrc.gov.

Sincerely,

/RA/

Frank Gillespie, Director
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure:
As stated

cc w/encl: See next page

Appendix E

June 13, 2006

Ms. Dorothy Guzzo
Deputy State Historic Preservation Officer
Historic Preservation Office
P.O. Box 404
Trenton, NJ 08625-0404

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION LICENSE RENEWAL
APPLICATION REVIEW (TAC NO. MC7625) (HPO-J2004-7021)

Dear Ms. Guzzo:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing an application to renew the operating license for Oyster Creek Nuclear Generating Station (Oyster Creek), which is located on the western shore of Barnegat Bay, in Forked River, New Jersey. Oyster Creek is operated by AmerGen Energy Company, LLC. As part of its review of the proposed action, the NRC staff has prepared a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437. The SEIS includes analyses of relevant environmental issues, including potential impacts to historic, archaeological and cultural properties from refurbishment activities associated with license renewal, for the extended period of operation. In accordance with our letter to you dated October 12, 2005, a copy of the draft supplement is enclosed. Pursuant to 36 CFR 800.8, we are requesting your comments on the draft supplement and on our preliminary conclusions regarding historic properties.

As stated in our October 12, 2005, letter the NRC staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs which may be impacted by post-license renewal land disturbing operation or projected refurbishment activities associated with the proposed action. The staff views the APE for the Oyster Creek license renewal as including the Oyster Creek site and the immediate environs.

The NRC staff has conducted an environmental audit at the site, and has reviewed historic and archaeological records. The NRC staff also contacted four Native American Tribes identified as having potential interest in the proposed undertaking. To date, no comments have been received.

In the context of the National Environmental Policy Act of 1969 under which the draft environmental impact statement was prepared, the NRC staff's preliminary determination is that the impact of license renewal on historical and archaeological resources is SMALL and additional mitigation is not warranted. Under the provisions of the National Historic Preservation Act of 1966, the NRC staff's preliminary determination is that there will be no historic properties affected for the proposed action.

D. Guzzo

-2-

Please note that the period for public comment expires on September 8, 2006. If your office requires additional time, or if there are any other questions regarding this correspondence, please have your representative contact the Environmental Project Manager, Dr. Michael Masnik, at 301-415-1191 or by e-mail at MTM2@nrc.gov.

Sincerely,

/RA/

Rani Franovich, Branch Chief
Environmental Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-219

cc: See next page



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

SEP 28 2006

Mr. Frank Gillespie, Director
Division of License Renewal
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RE: Essential Fish Habitat Consultation Regarding License Renewal of Oyster Creek
Nuclear Generating Station (TAC NO. MC7625)

ATTN: Dr. Michael Masnik, Senior Environmental Project Manager

Dear Mr. Gillespie:

The National Marine Fisheries Service (NMFS) has reviewed the essential fish habitat assessment that is contained within the draft supplement 28 to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS). The GEIS evaluates the proposed renewal of the operating license for the Oyster Creek Nuclear Generating Station (OCNGS), located in Lacey Township in Ocean County, New Jersey, for a period of an additional 20 years. We have submitted letters concerning the adverse effects to aquatic resources associated with the operation of this plant over the past three decades. The GEIS indicates that the plant has incurred adverse impacts on the estuarine community of Oyster Creek, the South Branch of Forked River, and a major portion of Barnegat Bay through its thermal discharge and cooling water intake facilities.

The supplement environment impact statement (SEIS) that was prepared by the U.S. Nuclear Regulatory Commission (NRC) evaluates the proposed action of license renewal for OCNGS and initiates an essential fish habitat consultation. The essential fish habitat assessment is included in Appendix E of the draft SEIS.

Project Background:

OCNGS employs a once-through cooling system designed to remove waste heat from the condensers. The circulating water system includes the intake canal, an intake structure divided into two bays, circulating water pumps, condensers, dilution pumps, discharge pipes, and the discharge canal. The system is capable of pumping as much as 1.25 million gallons per minute (gpm), but typically pumps less than one million gpm. An angled boom in the intake canal is immediately in front of the circulating water intake, preventing large mats of aquatic plant material, such as eelgrass (*Zostera marina*) and algae, from clogging the intake system. One purpose of the dilution pumps is to decrease



the attraction of migrating species of fish to the heated discharge during the fall, so that they will not remain in the estuary and become trapped by the heated discharge in the winter. Another purpose is to reduce thermal stress on the organisms in the discharge canal during the summer.

Barnegat Bay is the plant's cooling water source and heat sink. Cooling water is drawn from Barnegat Bay through the South Branch of Forked River and into a 150-foot-wide discharge canal, which also receives dilution water at ambient temperature; the water then flows to Oyster Creek and back to Barnegat Bay. Depths in the South Branch of the Forked River, canals, and lower reaches of Oyster Creek are maintained by periodic dredging.

Impacts on Aquatic Resources from Operation of the Cooling Water Intake

Page 4-17 of the document notes that impingement mortality studies were conducted between 1975 and 1978, and then again in 1985. We note concern that the latest study in the time series was conducted in 1985, 21 years ago. Table 4.5 summarizes the number of organisms impinged and the mortality significance for bay anchovy (*Anchoa mitchilli*), Atlantic menhaden (*Brevoortia tyrannus*), blue crab (*Callinectes sapidus*), sand shrimp (*Crangon septemspinosa*), Atlantic silverside (*Menidia menidia*), and winter flounder (*Pseudopleuronectes americanus*). The average annual impingement loss ranges from 13,000 winter flounder to eight million sand shrimp. Table 4.3 also lists hard clam (*Mercenaria mercenaria*), and opossum shrimp (*Neomysis integer*), including the organisms listed in Table 4.5, as organisms regularly entrained in large numbers. Despite large numbers of organisms impinged and entrained, the document notes that NRC staff concludes that potential impacts on fish and shellfish would be small, but acknowledges that compliance with EPA's phase II regulations may require modification of the facility.

The Alternatives Section of this document notes that a once-through (closed cycle) cooling system would result in a 70% decrease in water intake rates, which would likely result in a proportionate decrease in the number of impinged organisms.

Impacts on Aquatic Resources from the Cooling Water Discharge

Page 4-22 of the document discusses the history and effects of the thermal discharge, noting the possible need to modify thermal discharges, noting a high number of fish kills, likely caused by thermal shock due to an interruption of the heated effluent, especially during winter months. The document notes that NRC staff has concluded that, with plant changes in operation to regulate thermal discharges, and with expanded monitoring of the aquatic environment, potential impacts on fish and shellfish were determined to be small. We agree that operation changes and expanded monitoring have reduced the potential impact on fisheries, but do so with the caution that past fish kills, as with all fish kills, were likely underestimated. Many expired fish may have never surfaced for observation, and many of those that did surface were consumed by birds. In addition, we note that past fish kills often occurred as a result of emergency or unscheduled plant shutdowns,

especially in the winter. The document does not indicate how such emergency or unscheduled shutdowns which can result in fish kills would be less likely in the future.

Essential Fish Habitat Comments:

Fourteen federally managed species with EFH designations within the vicinity of OCNGS were identified in the EFH assessment. Of these, according to NRC's assessment, thirteen federally managed species could receive a substantial adverse effect due to the withdrawal of water via a once-through cooling system. However, the conclusion on page E-61 states that "OCNGS operations do not have an adverse effect on the food web in Barnegat Bay;" that "current mitigation measures reduce the potential adverse effect on EFH; and that "an additional 20 years of operation would result in a minimal adverse effect on EFH." The NRC has also determined that continued operation of the OCNGS' cooling system, with its existing mitigation measures, is expected to have a minimal adverse effect on EFH.

NMFS does not concur with the conclusion of the EFH assessment. The history of the plant operation, as documented throughout the GEIS, shows that thermal, entrainment, and impingement impacts are directly impacting EFH species and their prey species. These impacts have been well documented and the OCNGS operation continues to have direct and cumulative effects.

According to Table 5 of Appendix E of the SEIS (the EFH assessment), prey items consumed by twelve EFH species are regularly entrained or impinged at OCNGS. These species are black sea bass, bluefish, clearnose skate, dusky shark, little skate, red hake, sandbar shark, scup, summer flounder, tiger shark, windowpane flounder, winter flounder, and winter skate (Steimle, et al. 2000). Of the prey items, bay anchovy, sand shrimp, blue crab, and silversides are impinged or entrained in significant numbers, according to the document. In addition, four species, bluefish, scup, summer flounder, and winter flounder, have some life stage commonly destroyed by thermal, entrainment, or impingement impacts. Of these four species, winter flounder mortalities through impingement and entrainment are of greatest concern as the mortalities are relatively high in relation to the population. Collectively, the species represent a trophic hierarchy that receives food web impacts which are relevant to NRC statement above as "substantially adverse."

NMFS is particularly concerned about the OCNGS's cooling system's impact on winter flounder because recruitment of winter flounder has been below average since 1989; and the 2001 year class appears to be the smallest in 22 years (NEFSC 2003).

According to the NJDEP's Fact Sheet, NJPDES #NJ000550 regarding the OCNGS's Surface Water Renewal Permit Action, a "closed cycle cooling is the only cooling water intake structure technology available to the facility to reduce entrainment." NMFS agrees that "a closed cycle cooling serves to significantly limit the amount of intake flow and thereby reduces both impingement and entrainment."

Essential Fish Habitat Recommendations:

To minimize the impacts on EFH, pursuant to Section 305(b)(4)(A) of the MSA, NMFS recommends that the following conservation recommendation be adopted:

Implement the best available technology to mitigate impingement, entrainment, and thermal impacts. This is apparently best represented by the use of cooling towers to place the plant on a closed cycle cooling system. A closed cycle cooling system would reduce the water intake rates by 70%, and likely result in a proportionate reduction in fish and shellfish mortalities.

Please note that Section 305(b)(4)(B) of the MSA requires that the NRC provide NMFS with a detailed written response to this EFH conservation recommendation, including a description of measures adopted by the NRC for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with NMFS' recommendation, Section 305(b)(4)(B) of the MSA also indicates that the NRC must explain its reasons for not following the recommendation. Included in such reasoning would be the scientific justification for any disagreements with NMFS over the anticipated effect of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effect pursuant to 50 CFR 600.920(k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CFR 600.920(l), if new information becomes available or the project is revised in such a manner that affects the basis for the above EFH conservation recommendation.

Endangered Species Act (ESA)

Endangered and threatened Sea turtles may be present in the project area. The NRC is currently in consultation with the NMFS Northeast Region's Protected Resources Division pursuant to Section 7 of the ESA and the NRC will conclude the ESA consultation with this division of NMFS.

If you have any questions regarding these comments or need additional information, please contact Stan Gorski at 732-872-3037.

Sincerely,



Peter D. Colosi, Jr.
Assistant Regional Administrator
for Habitat Conservation

cc: PRD - M. Colligan



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2208

NOV 21 2006

Frank Gillespie, Director
Division of License Renewal
Office of Nuclear Reactor Program
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Oyster Creek Nuclear Generating Station

Dear Mr. Gillespie,

Enclosed is NOAA's National Marine Fisheries Service's (NMFS) Biological Opinion (Opinion) on the impacts on endangered and threatened species of the Nuclear Regulatory Commission's proposal to renew the Operating License for the Oyster Creek Nuclear Generating Station (OCNGS) for an additional twenty years. This Opinion is based upon NMFS independent review of information submitted by the NRC, available information on past takes of sea turtles at the facility and the available scientific information. In this Opinion, NMFS concludes that the continued operation of the OCNGS under a renewed Operating License may adversely affect but is not likely to jeopardize the continued existence of endangered Kemp's ridley, green, or threatened loggerhead sea turtles. NMFS has concluded that the action will not affect leatherback or hawksbill sea turtles as these species are not known to occur in the action area for this consultation.

The Incidental Take Statement (ITS), pursuant to Section 7 (b)(4) of the ESA, exempts the annual take of up to 8 sea turtles at the facility each year. NMFS anticipates that of these 8 sea turtles, no more than 3 of these turtles are likely to be loggerheads and no more than 1 of these sea turtles are likely to be a green sea turtle. NMFS anticipates that up to 3 of the 8 sea turtles may be dead; of the dead sea turtles, no more than 1 is likely to be a green sea turtle and no more than 1 is likely to be a loggerhead. The ITS specifies reasonable and prudent measures necessary to minimize and monitor take of listed species, including requiring the transfer of all sea turtles to a NMFS approved rehabilitation facility. The measures of the ITS are non-discretionary and must be undertaken by NRC for the incidental take exemption to apply.

This Opinion concludes formal consultation for the continued operation of the OCNGS. Reinitiation of this consultation is required if: (1) the amount or extent of taking specified in the ITS is exceeded; (2) new information reveals effects of these actions that may affect listed species or critical habitat in a manner that causes an effect to the listed species that was not considered in this Biological Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. NMFS will consider the take level to be



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exceeded, and reinitiation of consultation necessary, when *any* of the following situations occur in one calendar year:

- Capture of more than 1 green sea turtle (dead or alive); or,
- Capture of more than 3 live loggerhead sea turtles; or,
- Capture of more than 1 dead loggerhead sea turtle; or,
- Capture of more than 3 dead Kemp's ridley sea turtles; or,
- Capture of more than 8 total sea turtles.

As identified in the Opinion, NMFS Northeast Regional staff must be contacted within 24 hours of any interactions with a sea turtle.

It is NMFS understanding that OCNCS will operate under its current license until April 9, 2009. At the time NRC renews the license for OCNCS, NMFS will consider the September 22, 2005 Biological Opinion and ITS withdrawn and this Biological Opinion and ITS will become effective. Should you have any questions regarding this Biological Opinion or any consultation requirements, please contact Julie Crocker of my staff at (978)281-9300 x6530 or the Endangered Species Coordinator at (978) 281-9328. NMFS appreciates your assistance with the protection of threatened and endangered sea turtles. I look forward to continued cooperation with NRC during future Section 7 consultations.

Sincerely,


Patricia A. Kurkul
Regional Administrator

cc: H. Nash, NRC
M. Browne, AmerGen
Williams, GCNE

File code: Section 7 NRC – Oyster Creek 2006
PCTS: F/NER/2006/05114



An Exelon Company

AmerGen Energy Company, LLC
Route 9 South
Forked River, NJ 08731

2130-06-20425
December 1, 2006

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

State of New Jersey Department of Environmental Protection
Attention: Andrew Heyl, Supervisor
Bureau of Coastal Regulation
501 East State Street
Trenton, NJ 08625-0439

Re: Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Federal Consistency Certification for Oyster Creek Generating Station License
Renewal Application

Ladies and Gentlemen:

This letter provides the certification of AmerGen Energy Company, LLC (AmerGen) to the U.S. Nuclear Regulatory Commission (NRC) and the State of New Jersey Department of Environmental Protection (NJDEP) that the proposed renewal of the NRC Operating License for the Oyster Creek Generating Station (OCGS) in Lacey Township, NJ, complies with the enforceable policies of the New Jersey Coastal Management Program, and that continued operation of OCGS will be conducted in a manner consistent with that Program. AmerGen requests that the State indicate its concurrence with the Certification.

The Certification includes a set of findings relating the coastal effects of continued operation of OCGS to the relevant policies and enforceable rules of the New Jersey Coastal Zone Management Program. Attachment 1 to the Certification reproduces each Program policy and rule and explains the basis for AmerGen's conclusion that renewal of the OCGS Operating License will comply, or that a particular policy or rule does not apply to the proposed license renewal. This includes a description of the application of the Basic Coastal Policies and the Basic Location Rule, which collectively require an assessment of the public interest. The assessment shows that renewal of the OCGS operating license is clearly in the public interest for many important reasons, including: maintaining an essential source of electricity generation within New Jersey vital to the welfare of all New Jersey; maintaining a substantial number of jobs for skilled workers; and providing a clean source of energy that does not generate carbon dioxide, nitrogen oxides, sulfur oxides and other contaminants that would be generated by the fossil fueled plants that would be required if this license is not renewed.

NJ DEP/US NRC
December 1, 2006
Page 2 of 4

AmerGen has diligently sought to identify every provision of the New Jersey Coastal Zone Management Rules that could apply to the license renewal so that our certification of compliance provides the State with complete information. Since our initial letter¹ to the State, the National Oceanic and Atmospheric Administration (NOAA) has revised the rules for the CZMA certification process. So to ensure we provide all the required information, and pursuant to the new NOAA rules, AmerGen has communicated often with the State to determine as best we can, all information the State deems necessary for a CZMA Certification. AmerGen submitted a detailed "Checklist of Information To Be Submitted," on August 15, 2006, and the State's Bureau of Coastal Zone Management responded on September 15, 2006, agreeing that the Checklist covers the pertinent State rules.

NOAA first approved the NJDEP Coastal Zone Management Program (CZMP) in 1978, followed by another approval of some additional program elements in 1980. It is our understanding that since 1980, there have been further additions to the State's CZMP. While the required CZMA consistency review is limited to the State's NOAA-approved program, AmerGen is certifying its consistency with all provisions of the current NJ CZMP that would be applicable if they had been approved by NOAA, not just those that have been officially approved by NOAA. In short, the Checklist of provisions of the NJ CZMP that AmerGen has submitted to NJDEP that both NJDEP and AmerGen have cooperatively agreed to consider applicable for the consistency certification, includes requirements that may go beyond what the CZMA requires an applicant in AmerGen's position to certify.

AmerGen is providing to the Department associated data and information, including a copy of AmerGen's application to the NRC, the supporting material AmerGen provided to the NRC, information specifically identified as required in the New Jersey Coastal Zone Management Rules, and other information requested by representatives of the Department in the course of the extensive interactions between the Department and AmerGen since first meeting on February 17, 2004, to discuss the license renewal process for OCGS.

In addition, on June 1, 2006, the Department provided AmerGen "State Guidance for Forthcoming Federal Consistency Request for License Renewal of AmerGen's Oyster Creek Nuclear Generating Station" (Guidance). The Guidance identifies sections of the State's Coastal Zone Management Rules (Rules) that the Department determined to be applicable to renewal of the OCGS Operating License based on the information then available to it, provided specific questions to be addressed by AmerGen, and cautioned that AmerGen should review the identified Rules in their entirety to assure a complete and appropriate discussion of the degree of OCGS compliance with each Rule's criteria. In addition, the Guidance states that "although not included in the Department's list, both the eight (8) Basic Coastal Policies (N.J.A.C. 7:7-1.5(a)) and the Basic Location Rule (N.J.A.C. 7:7E-6.2) may be utilized in the decision making process. Finally, the Guidance states that it is not to be construed as a final list of Rules or issues that may need to be discussed by AmerGen. Thus, this Consistency Certification, and its

¹ AmerGen submitted a CZMA Consistency Certification in 2005 that was premature because the Renewal Application to the NRC had not yet been submitted, and the Department identified certain information that AmerGen had failed to provide. AmerGen and NJDEP mutually agreed to have the entire CZMA Certification Process begin anew, as set forth in a Memorandum of Understanding between NJDEP and AmerGen regarding the CZMA Review for Renewing the Operating License for the Oyster Creek Generating Station, September 2005. AmerGen is providing with this consistency determination the information previously identified as missing. Examples of such information include: a commitment to provide public access to the waterfront through the Finninger Farm; a copy of the Biological Opinion of the National Marine Fisheries Service concerning the impacts of OCGS operations on sea turtles; and a copy of the application and supporting material submitted to the NRC.

Appendix E

NJ DEP/US NRC
December 1, 2006
Page 4 of 4

Please call Bill Maher at (610) 765-5939 if you have any questions or require any additional information to review the attached certification.

Sincerely,



Timothy Rausch
Site Vice President
Oyster Creek Generating Station
AmerGen Energy Company, LLC

Enclosure: Federal Consistency Certification: Coastal Zone Management Act of 1972
(CZMA)

cc: Ruth Ehinger, NJDEP (w/Enclosure, Attachment A)
Michael Masnik, USNRC (w/Enclosure, Attachment A)
Karen Tuccillo, NJDEP BNE (w/Enclosure, Attachment A)
Peter Tam, Senior Project Manager, USNRC NRR (w/Enclosure, Attachment A)

December 5, 2006

Mr. Peter D. Colosi, Jr.
Assistant Regional Administrator for
Habitat Conservation
National Marine Fisheries Service
Northeast Regional Office
One Blackburn Drive
Gloucester, MA 09130-2298

**SUBJECT: RESPONSE TO ESSENTIAL FISH HABITAT CONSERVATION
RECOMMENDATION REGARDING THE PROPOSED LICENSE RENEWAL OF
OYSTER CREEK NUCLEAR GENERATING STATION**

Dear Mr. Colosi:

The U.S. Nuclear Regulatory Commission (NRC) received the letter, dated September 28, 2006, providing the National Marine Fisheries Service's (NMFS's) comments and conservation recommendation in response to the NRC's essential fish habitat (EFH) assessment for the proposed license renewal of the Oyster Creek Nuclear Generating Station (OCNGS). The EFH consultation was initiated pursuant to Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265, December 1996), and the EFH assessment was included in an appendix to our draft Supplemental Environmental Impact Statement (SEIS) regarding OCNGS, which was issued in June 2006. In addition to responding to some of your comments on the SEIS, this letter contains the NRC's written response to your conservation recommendation, as required by Section 305(b)(4)(B) of the Act. NRC staff appreciates your willingness to grant us an extension for this written response until December 15, 2006.

NRC regulations (in 10 CFR 51) define NRC's impact categories as small, moderate, and large. For fish and shellfish, such categorization is based on potential impacts to populations, not individual organisms. Thus, population-level impacts due to entrained and impinged organisms are assessed. Because the NRC and NMFS are governed primarily by different regulations, it is possible that each agency assesses environmental impacts on different trophic levels. However, we believe both agencies share the same goal of protecting and sustaining aquatic resources in Barnegat Bay.

We also share your concern regarding the dated impingement mortality studies. The NRC determined that no recent impingement data were available when we began our review, and we recognize the limitations of the currently available impingement data. However, the NRC is required to conduct environmental analyses using the best available information; therefore, our SEIS and EFH assessment relied heavily on studies conducted in the 1970s and 1980s. Accordingly, the final SEIS will reflect the uncertainties and limitations of using historical monitoring data to evaluate future adverse impacts.

P. Colosi, Jr.

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The U.S. Environmental Protection Agency (EPA), or delegated State as is the case with New Jersey, has the authority to require impingement monitoring studies whereas the NRC is prohibited from imposing any such monitoring programs. The State of New Jersey did not require any additional impingement monitoring studies after the 316(b) demonstration study for OCNGS was approved in the mid 1980s. To demonstrate compliance with EPA's Clean Water Act Section 316(b) Phase II regulations, the licensee began a comprehensive demonstration study in September 2005; the results will be available in January 2008.

While the draft SEIS does not specifically refer to any impacts on "a major portion of Barnegat Bay" as stated in your letter, the NRC has revised the SEIS to clarify that only portions of central Barnegat Bay adjacent to Forked River and Oyster Creek would be impacted by license renewal of OCNGS. Additionally, because there are no recent population data for species in Barnegat Bay, impacts on the food web in central Barnegat Bay are difficult to determine, which also will be clarified in the final SEIS.

Your letter also expressed concern with the high number of fish kills related to OCNGS's thermal discharge. There have been 37 fish kills since OCNGS began operating in 1969. However, the number and frequency of fish kills have declined substantially since the 1970s, and the licensee has increased its awareness and response to such incidents over the years. There is a fish kill monitoring procedure in place at OCNGS that requires a survey of the discharge canal and parts of Oyster Creek; the survey is conducted on foot or by boat using dip nets to retrieve the stressed and dead fish. A report to the New Jersey Department of Environmental Protection (NJDEP) and the NRC includes the species and number of stressed or dead fish collected. In the past, underwater cameras and scuba divers have been used to observe the extent of fish kills; such observations have not indicated that there were many expired fish at or near the bottom of the discharge canal or Oyster Creek. Therefore, it is unlikely that the magnitude of fish kills in the discharge canal or Oyster Creek has been underestimated.

In the EFH assessment, the NRC determined that while continued operations of OCNGS may have direct adverse effects on EFH for some species and their prey species, adverse effects are unlikely to be detected in the Barnegat Bay food web. Given that the NRC will revise the SEIS to clarify near-field and far-field impacts to aquatic species, such revisions would also apply to the EFH assessment if the consultation process allowed for draft and final versions of the assessment.

We also agree with NMFS that entrainment and impingement impacts on winter flounder (*Pseudopleuronectes americanus*) are of the greatest concern of all species assessed. The staff recognizes that some adverse effect may occur in the food web; however, there is no indication that such a perturbation has affected the Barnegat Bay food web and ecosystem.

Regarding the EFH conservation recommendation for OCNGS, NRC agrees with NMFS that the best available technology for reducing entrainment, impingement, and thermal effects is closed-cycle cooling. However, the installation of cooling towers has impacts beyond those affecting fish and shellfish, and other considerations have to be taken into account before a decision is made. Additionally, there may be other alternatives to closed-cycle cooling that may adequately protect Federally managed fish and shellfish populations despite the fact that such alternatives would adversely affect EFH. Cooling towers and other alternatives, which may also adversely affect EFH, are discussed in Chapter 8 of the SEIS. NRC cannot require specific

P. Colosi, Jr.

- 3 -

mitigation measures; instead, the NJDEP has such authority, as delegated by the EPA. Such mitigation measures would be imposed under the National Pollutant Discharge Elimination System (NPDES) permit for OCNCS. OCNCS cannot operate without a valid NPDES permit. NJDEP may require additional mitigation measures, such as requiring closed-cycle cooling, modification of the cooling system, or restoration, to reduce impacts due to entrainment and impingement. New Jersey's decision regarding the NPDES permit requirements for OCNCS may constitute new information relative to effects on EFH per 50 CFR 600.920(l), which may require NRC to reinitiate the EFH consultation. The NRC encourages NMFS to collaborate with NJDEP to evaluate the data currently being collected to determine the best way to minimize effects on EFH.

The NRC recommends that additional environmental monitoring be conducted in the bay to establish a baseline and determine if detectable changes have occurred in species composition and abundance over the past three decades. Such studies should be comprehensive, involve all stakeholders including resource agencies and the licensee, and incorporate designs to evaluate anthropogenic and natural environmental stressors on Barnegat Bay at spatial and temporal scales sufficient to address the inherent variability within the ecosystem. The NRC believes that integrated monitoring studies will enable resource managers to understand better the relative contributions of individual and collective environmental stressors on Barnegat Bay and facilitate prioritization of management actions to reduce adverse impacts on the ecosystem.

Based on our understanding of the EFH consultation requirements, this response letter concludes the NRC's EFH consultation with NMFS regarding the OCNCS license renewal project. Also, regarding the Section 7 consultation for continued operations at OCNCS, your Protected Resources Division concluded the consultation with the issuance of an updated Biological Opinion on November 21, 2006. If you have any questions concerning the NRC's response to NMFS's conservation recommendation or other aspects of the OCNCS license renewal project, please contact Harriet Nash of my staff at 301-415-4100 or HLN@nrc.gov.

Sincerely,

/RA/

Pao-Tsin Kuo, Acting Director
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

Docket No. 050-219

cc: see next page

**MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION AND
AMERGEN ENERGY COMPANY, LLC,
REGARDING THE COASTAL ZONE MANAGEMENT ACT REVIEW
FOR RENEWING THE OPERATING LICENSE FOR
THE OYSTER CREEK NUCLEAR GENERATING STATION**



**MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, AND
AMERGEN ENERGY COMPANY LLC
REGARDING THE COASTAL ZONE MANAGEMENT ACT REVIEW
FOR RENEWING THE OPERATING LICENSE FOR
THE OYSTER CREEK NUCLEAR GENERATING STATION**

PURPOSE

The New Jersey Department of Environmental Protection (NJDEP), and AmerGen Energy Company LLC (AmerGen) (collectively, the parties) hereby enter into this memorandum of understanding (MOU) concerning an application filed with the Nuclear Regulatory Commission (NRC) by AmerGen, seeking to renew the operating license for its Oyster Creek Nuclear Generating Station located within the coastal zone of the State of New Jersey.

STATEMENT OF FACTS

The parties agree to the following facts:

1. On January 21, 2005, AmerGen submitted to NJDEP a consistency certification under the Coastal Zone Management Act (CZMA) federal consistency provision (16 U.S.C. § 1456(c)(3)(A)) and National Oceanic and Atmospheric Administration's (NOAA's) regulations (15 C.F.R. part 930, subpart D);
2. On August 19, 2005, NJDEP objected to AmerGen's CZMA consistency certification based upon a lack of information. AmerGen must file its notice of appeal of NJDEP's August 19, 2005, objection with the Secretary by September 19, 2005;
3. Pursuant to the recently enacted Energy Policy Act of 2005 (Pub. L. No. 109-58), the Secretary of Commerce (Secretary) must use NRC's and NJDEP's decision records as the initial record to decide AmerGen's CZMA appeal. At the present time, NRC is in the initial stages of reviewing AmerGen's application to renew its operating license, and will be gathering additional technical and environmental information as part of its review that will be included as part of the record of its decision;
4. Under 15 C.F.R. § 930.51(f), federal consistency applies only to active applications. AmerGen filed its consistency certification six months before filing its application to renew its operating license with NRC on July 22, 2005; and

Appendix E

5. Under 16 U.S.C. § 1456(c)(3)(A) and 15 C.F.R. § 930.57(a), an applicant provides in the application to the federal licensing agency a consistency certification. This does not require the applicant to provide a consistency certification at the time the application is submitted; rather, the applicant (in this case AmerGen) provides the consistency certification when the applicant has the necessary data and information required by the CZMA and NOAA's regulations and at an appropriate time during the federal licensing agency's process (in this case NRC's process).

AGREEMENTS

Based upon the above statement of facts, the parties agree to the following:

1. AmerGen hereby withdraws its consistency certification, dated January 21, 2005, from NJDEP's consideration;
2. NJDEP hereby withdraws its consistency objection, dated August 19, 2005. NJDEP believes it will need the information described in NJDEP's August 19 objection letter, to respond to any consistency certification resubmitted by AmerGen under paragraph 3, below. AmerGen expresses no opinion regarding NJDEP's need for the information;
3. AmerGen shall resubmit to NJDEP its CZMA consistency certification and necessary data and information, pursuant to 15 C.F.R. part 930, subpart D, at an appropriate time during the NRC's review process;
4. Once NJDEP receives AmerGen's consistency certification and necessary data and information under paragraph 3 pursuant to 16 U.S.C. § 1456(c)(3)(A) and 15 C.F.R. part 930, subpart D, NJDEP's six-month review period shall begin;
5. If NJDEP objects to AmerGen's resubmitted consistency certification, AmerGen may file an appeal with the Secretary within the time frames established by NOAA's CZMA regulations;
6. The CZMA review prompted by AmerGen's consistency certification dated January 21, 2005, is hereby superseded by any subsequent review that shall occur once AmerGen resubmits its consistency certification as envisioned in paragraph 3. NJDEP and AmerGen shall retain all rights under the CZMA relative to this subsequent consistency certification; and
7. This MOU may be executed in counterparts.

6107655807

11:43:20 a.m. 09-19-2005

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**SIGNATURES FOR MOU BETWEEN NJDEP AND AMERGEN REGARDING THE
CZMA REVIEW FOR RENEWING THE OPERATING LICENSE FOR THE OYSTER
CREEK NUCLEAR GENERATING STATION**

Mark D. Mauriello 9/19/05
 For NJDEP Date
 Mark Mauriello
 Director, Land Use Regulation Program

Pam Cowan 9/19/05
 For AmerGen Date
 Pam Cowan
 Director, Licensing and Regulatory Affairs
 AmerGen Energy Company LLC

STATEMENT BY NOAA:

While NOAA is not a party to this MOU, it has no objections to its terms. Since both AmerGen's consistency certification and NJDEP's objection have been withdrawn, that proceeding has terminated. If a new consistency certification is submitted by AmerGen, and NJDEP issues an objection, the CZMA and NOAA regulations would allow AmerGen to file an appeal with the Secretary in that new proceeding.

Joel La Bissonniere 9/19/05
 For Date
 Assistant General Counsel
 NOAA Office of General Council for Ocean Services

**ESSENTIAL FISH HABITAT ASSESSMENT
FOR RENEWAL OF THE OYSTER CREEK NUCLEAR GENERATING
STATION OPERATING LICENSE**

1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act, (FCMA) which was reauthorized and amended by the Sustainable Fisheries Act of 1996, sets forth the essential fish habitat (EFH) provisions designed to protect important habitats of Federally managed marine and anadromous fish species. The Act requires the eight regional fishery management councils to describe and identify EFH in their respective regions, to specify actions that would conserve and enhance EFH, and to minimize the adverse effects of fishing on EFH. Pursuant to the Act, Congress has defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”. Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to NMFS’s conservation recommendations. For the purpose of consultation, an adverse effect includes any impact that reduces the quality and/or quantity of EFH. The consultation document must include the following information:

- A description of the proposed action;
- An analysis of the potential adverse effects of the action on EFH and the managed species;
- The Federal agency’s conclusions regarding the effects of the action on EFH; and
- Proposed mitigation, if applicable.

On July 22, 2005, the U.S. Nuclear Regulatory Commission (NRC) received an application from AmerGen Energy Company, LLC (AmerGen), for renewal of the operating license (OL) of the Oyster Creek Nuclear Generating Station (OCNGS), which expires on April 9, 2009. As part of the application, AmerGen submitted an Environmental Report (ER) (AmerGen 2005a) prepared in accordance with the requirements of Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51).

On September 22, 2005, the NRC staff published (NRC 2005a) a Notice of Intent to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996,1999). During the development of the Supplemental Environmental Impact Statement (SEIS), the NRC staff visited the site, met with members of Federal and State regulatory agencies, spoke to local citizens, interviewed individuals who had conducted environmental research in Oyster Creek, Forked River, or Barnegat Bay, and reviewed a variety of technical reports, journal articles, and other relevant information to determine whether license renewal would result in adverse environmental impacts. This information and other sources relevant to EFH issues were

consulted during the development of this document. This EFH assessment has been developed to fulfill the NRC requirement under the FCMA for the OCNGS license renewal review.

2.0 PROPOSED FEDERAL ACTION

The proposed Federal action is renewal of the OL for OCNGS, a nuclear power plant that is located in eastern New Jersey adjacent to Barnegat Bay. OCNGS is a single-unit plant with a boiling-water reactor and steam turbine manufactured by General Electric. The reactor has a design power level of 1930 megawatts thermal (MW[t]) and a net power output of 640 megawatts electric (MW[e]). Plant cooling is provided by a once-through cooling system that draws cooling water from Barnegat Bay via the Forked River and a man-made intake canal, and discharges heated water back to Barnegat Bay via a discharge canal and Oyster Creek. The current OL for OCNGS expires on April 9, 2009. By a letter dated July 22, 2005, AmerGen submitted an application (AmerGen 2005b) to the NRC to renew the OL for an additional 20 years of operation (i.e., until April 9, 2029). Details concerning the renewal of the OL can be found on the NRC website (NRC 2006a).

3.0 ENVIRONMENTAL SETTING

OCNGS is located in eastern New Jersey, approximately 60 mi south of Newark, 35 mi north of Atlantic City, and 50 mi east of Philadelphia, Pennsylvania (Figure 1). The nearest major water body is Barnegat Bay, a protected estuary on the central New Jersey coast (Figure 2). OCNGS is bounded on the north by the South Branch of the Forked River and on the south by Oyster Creek (Figure 3). Barnegat Bay is a shallow, lagoon-type estuary that is separated from the Atlantic Ocean by a nearly contiguous barrier island complex (Chizmadia et al. 1984; BBNEP 2001). The bay is approximately 43 mi long and 3 to 9 mi wide. Depths range from 3 to 23 ft, with the greatest depths associated with the Intracoastal Waterway, a dredged channel running parallel to the U.S. eastern seaboard (Chizmadia et al. 1984; BBNEP 2002). The total quantity of water associated with the bay is estimated to be 60 billion gal (Guo et al. 2004). The estuary is bordered by the mainland to the west, Point Pleasant and Bay Head to the north, the barrier islands to the east, and Manahawkin Causway to the south. Freshwater enters the bay from numerous streams, including, from north to south, Manasquan River and Canal, Metedeconk River, Kettle Creek, Toms River, Cedar Creek, Stout Creek, Forked River, and Oyster Creek (Chizmadia et al. 1984). Seawater enters the bay from the north through the Point Pleasant Canal via Manasquan Inlet and from the south through Little Egg Inlet. There is also an entrance to Barnegat Bay via Barnegat Inlet, a narrow navigable passage to the Atlantic Ocean through the barrier islands located to the southeast of Oyster Creek. The configuration of the Barnegat Inlet jetty system and the entrance channel have undergone extensive modifications by the U.S. Army Corps of Engineers, and a major



Figure 1. Location of Oyster Creek Nuclear Generating Station, 50-mi Region
(Source: AmerGen 2005a)

program was initiated in 1988 to realign the south jetty and dredge accumulated sediments from the channel to improve navigation (Seabergh et al. 2003). Because of the limited connection of Barnegat Bay to the Atlantic Ocean, tides in the bay are attenuated relative to the open ocean. Complete turnover of the water within the bay is estimated to occur every 96 tidal cycles with 1 tidal cycle completed every 12.7 hr (Chizmadia et al. 1984;

Appendix E

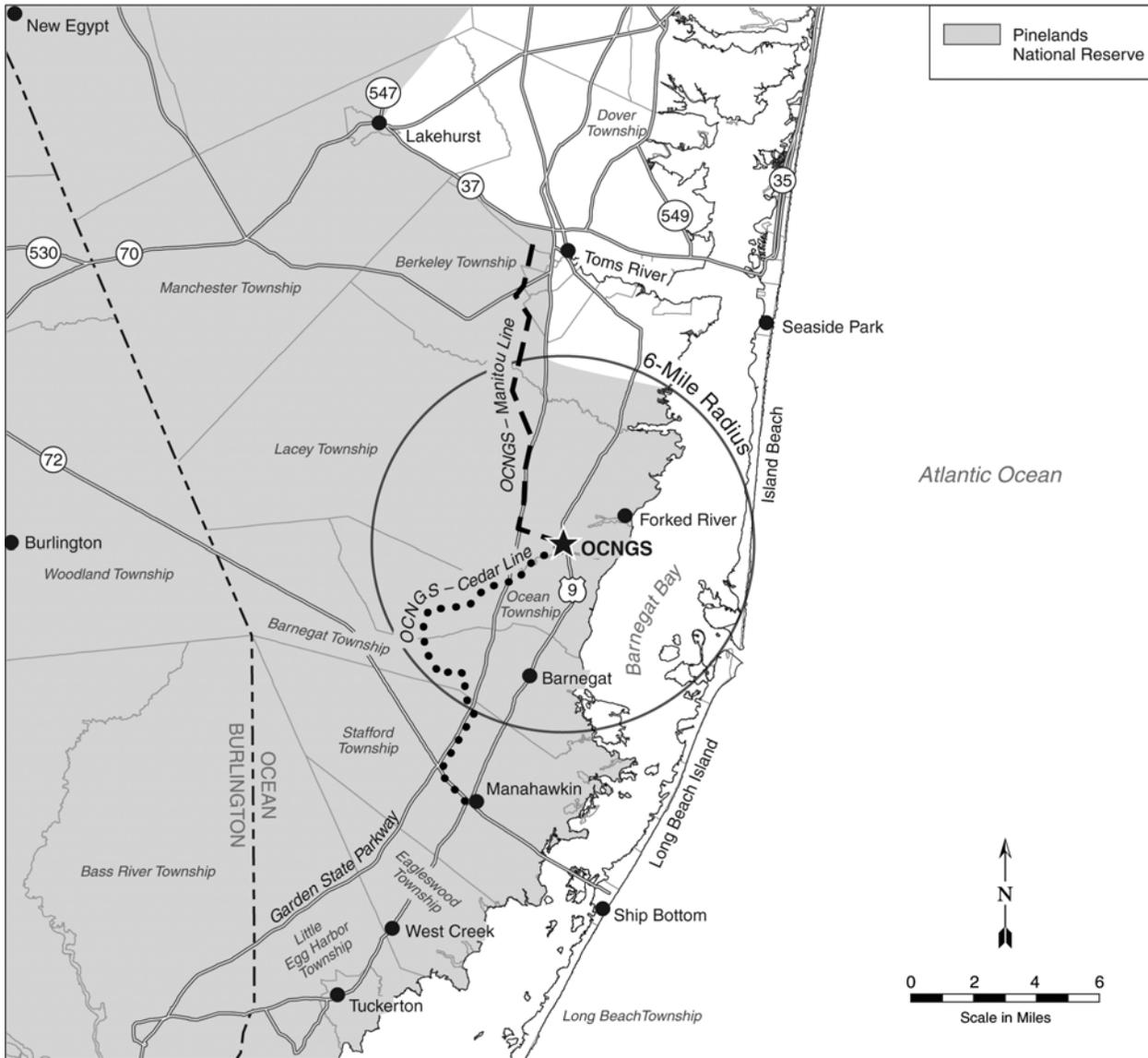


Figure 2. Location of Oyster Creek Nuclear Generating Station, 6-mi Region
(Source: AmerGen 2005a)

Guo et al. 2004). Salinity ranges from approximately 11 to 32 parts per thousand (ppt); the highest salinity is associated with the inlets, and the lowest is along the western shoreline near the mouths of various rivers and creeks. Water temperature in Barnegat Bay ranges from an average of 34.9 °F (1.6 °C) in winter to 73.4 °F (23.0 °C) in summer (Chizmadia et al. 1984; BBNEP 2001).

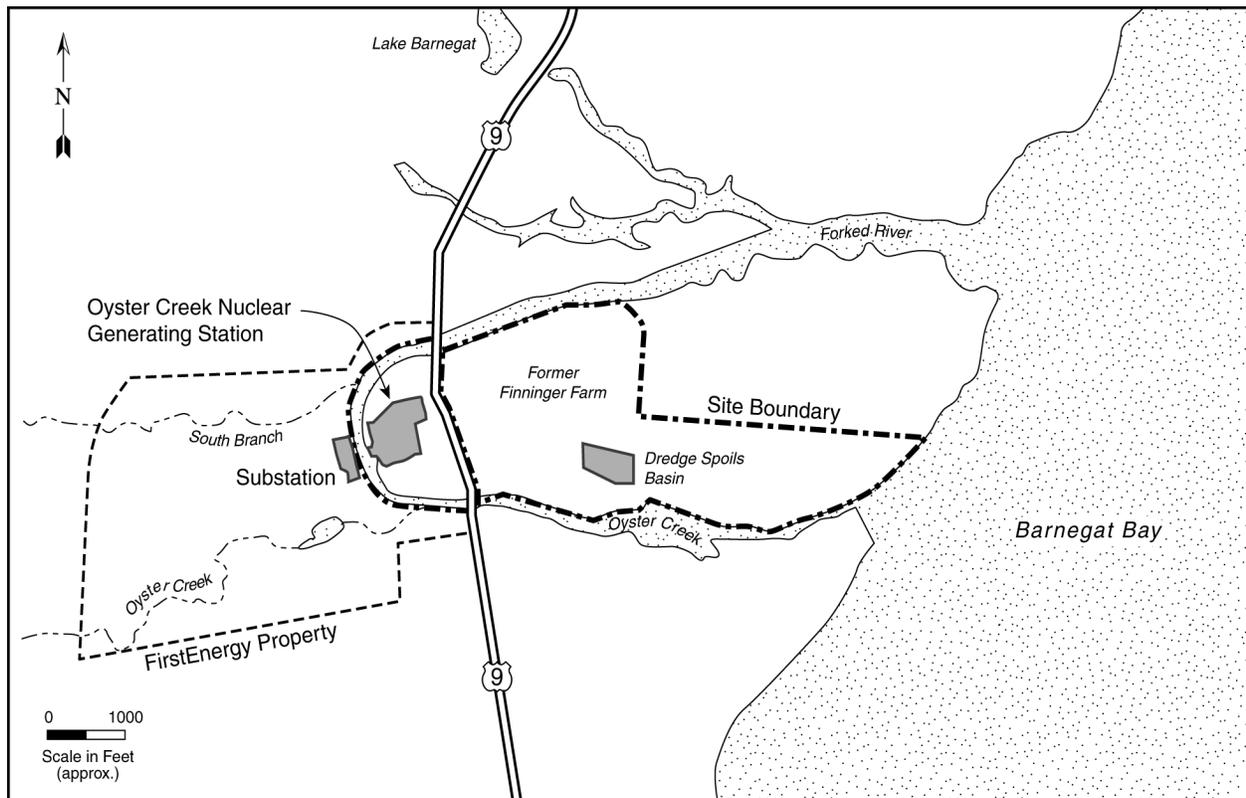


Figure 3. Oyster Creek Nuclear Generating Station Site Boundary
(Source: AmerGen 2005a)

The substrate of Barnegat Bay is typical of a shallow estuary. Central portions of the bay are composed primarily of fine to medium sand, with muddier sand present closer to the western shore. The intertidal areas adjacent to the mouths of Forked River and Oyster Creek are primarily sandy mud (Chizmadia et al. 1984). The barrier islands and mainland shores of Barnegat Bay support a network of salt marshes and other coastal wetlands that represent important habitats for juvenile fish and invertebrates (BBNEP 2001). In recent years, concern has been raised regarding the loss of salt marsh habitat along the Atlantic Coast (GLCF 2005). The cause of the observed losses is not known, but it is assumed to be a combination of sea level rise and hydrologic changes that result in an inadequate supply of sediment required for marsh maintenance (Hartig and Gornitz 2001).

4.0 PLANT COOLING-WATER SYSTEM DESCRIPTION

OCNGS has a once-through cooling system that uses water from Barnegat Bay. Cooling water is withdrawn from the bay via the South Branch of the Forked River, then through a 150-ft-wide

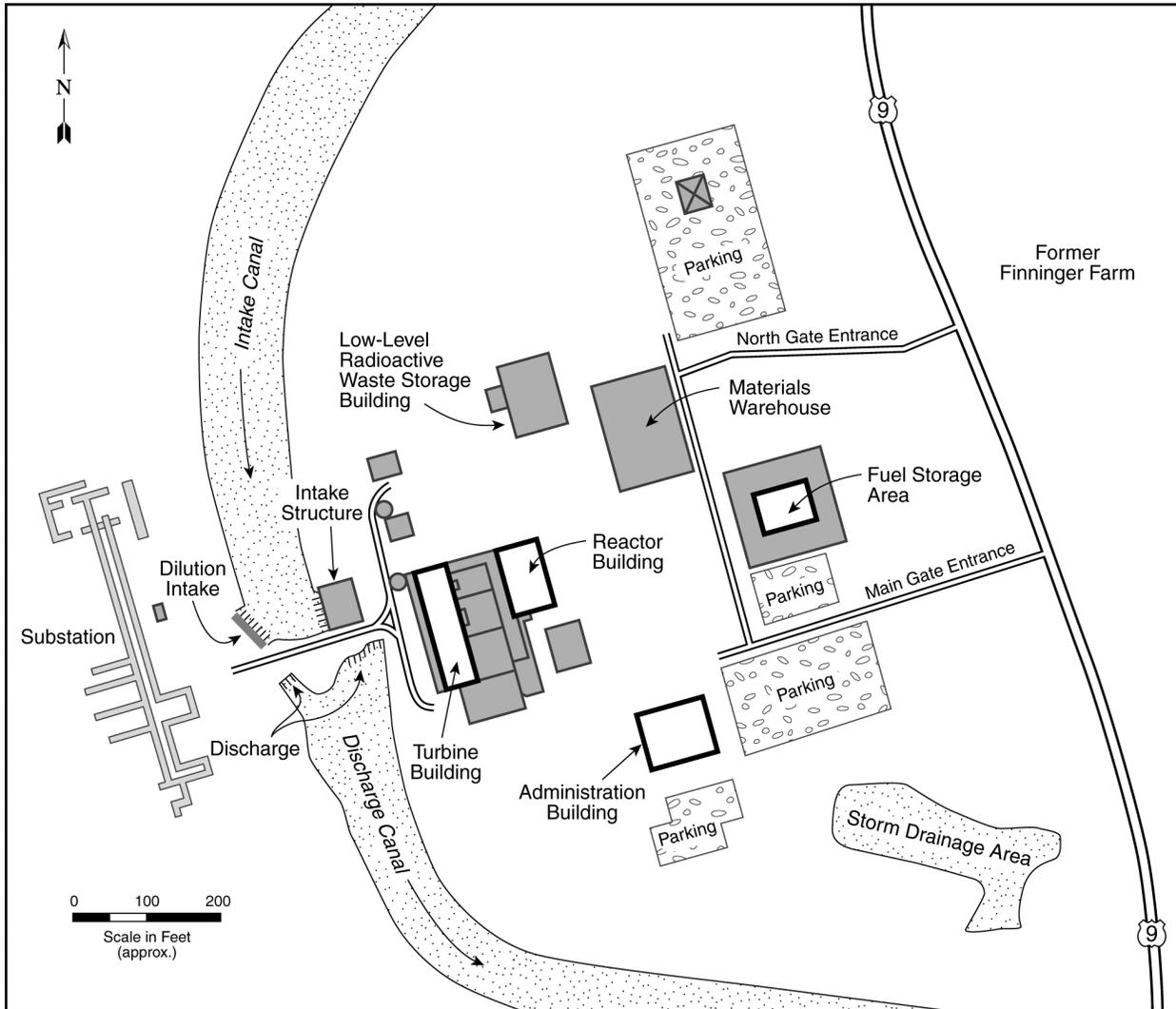


Figure 4. Oyster Creek Nuclear Generating Station Site Layout
(Source: AmerGen 2005a)

intake canal to the intake structure. Heated cooling water is discharged to a 150-ft-wide discharge canal that flows into Oyster Creek, which in turn flows into the bay. The intake and discharge canals are divided by a berm. Three dilution pumps move water from the intake canal directly into the discharge canal to lower the temperature of the station cooling water in the discharge canal. Details on the circulating-water system are presented below. Unless otherwise noted, the discussion of the circulating-water system was obtained from the Updated Final Safety Analysis Report (AmerGen 2003), the Final Environmental Statement for OCNCS operations (AEC 1974), or the ER (AmerGen 2005a).

The intake structure has two bays, each equipped with a trash rack, a 3/8-in.-mesh traveling screen, a screen-wash system, two service-water pumps, two emergency service-water pumps, and two circulating-water pumps. Each of the four circulating-water pumps located in the intake structure can provide up to 115,000 gallons per minute (gpm) of cooling water to the condensers. In addition to the circulating water system OCNGS has a separate service water system that provides cooling water to the reactor building and turbine building heat exchangers. An angled boom in the intake canal immediately in front of the intake prevents large mats of eelgrass and algae from clogging the intake system.

The trash racks are composed of nearly vertical steel bars on 3-in. centers, with effective openings of 2.5 in. After passing through the trash racks, water passes through 3/8-in.-mesh traveling screens equipped with Ristroph buckets. A low-pressure screen wash washes off impinged aquatic organisms and debris into the Ristroph buckets. The Ristroph buckets empty into a flume that conveys the fish and shellfish to the head of the discharge canal in the area of the dilution pump discharge (NJDEP 2005a).

Each bay of the intake structure has a service-water pump with a capacity of 6000 gpm, a second service-water pump with a capacity of 2000 gpm, two emergency service-water pumps each with a capacity of 4150 gpm, and a screen-wash pump with a capacity of 900 gpm. These pumps are located immediately downstream of the traveling screens. Service water provides cooling water to the reactor building and turbine building heat exchangers. The service water empties into the discharge canal.

Three dilution water pumps (low-speed, axial flow pumps with 7-ft impellers, each rated at 260,000 gpm) are located on the western side of the intake canal and are protected by trash racks. Because the dilution pump intakes lack traveling screens, fish may be drawn through the pumps. No impingement or entrainment safeguards are present; however, AmerGen contends that the pump design allows for some impingement and entrainment survivability (NJDEP 2005a). The purpose of the dilution pumps is to decrease the temperature of the discharge water, which otherwise would encourage migratory fish to stay during the spring and fall, and to reduce thermal stress on organisms in the discharge canal during the summer. The use of the dilution pumps is covered in the New Jersey Pollutant Discharge Elimination System (NJPDES) permit, which allows only two of the three pumps to operate concurrently during normal operations. During a station shutdown, dilution pumps are operated to minimize the impact of thermal shock on organisms in Oyster Creek and Barnegat Bay. In the winter, a recirculation tunnel transfers water from the discharge to the intake structure as needed to prevent icing.

Sodium hypochlorite is injected into the circulating-water and plant service-water systems, and chlorine gas is injected into the augmented off-gas/new radioactive waste service-water system to minimize fouling in the pipes and condensers. The main condenser's six sections are chlorinated one at a time so that the sections are consecutively chlorinated for 20 minutes each

during the daily cycle for a maximum of 2 hours per day of chlorination for the entire condenser (NJDEP 2005a).

5.0 POTENTIAL IMPACTS OF PLANT OPERATION ON BIOTA AND HABITAT

The cooling-water system associated with OCNGS utilizes water from Forked River and Barnegat Bay and may affect EFH in the following ways:

- Impingement of juvenile or adult forms of fish and shellfish;
- Entrainment of eggs or larvae of fish and shellfish, or of phytoplankton and zooplankton that form the basis of the nearshore marine food webs; and
- Discharge of heated cooling water containing biocides or other chemicals into Oyster Creek and Barnegat Bay

These impacts are discussed in this section.

5.1 IMPINGEMENT

At maximum flow, with all circulating and dilution pumps operating, the OCNGS cooling-water system requires approximately 1.25 million gpm. However, the licensee normally does not operate more than two dilution pumps at a time so total plant flow is typically less than one million gpm. At this flow rate, the velocity in the intake and discharge canals is typically less than 2.0 ft/s, but the flow is sufficient to result in impingement of fish and shellfish on the traveling screens associated with the cooling-water intake system.

Impingement mortality studies were conducted between 1965 and 1977 on a variety of fish and shellfish species, including bay anchovy (*Anchoa mitchilli*), Atlantic silverside (*Menidia menidia*), winter flounder (*Pseudopleuronectes americanus*), Atlantic menhaden (*Brevoortia tyrannus*), sand shrimp (*Crangon septemspinosa*), and blue crab (*Callinectes sapidus*). Winter flounder exhibited the highest survival after impingement (77 to 93 percent), and bay anchovy exhibited the lowest survival (4 to 19 percent) (Summers et al. 1989).

5.2 ENTRAINMENT

During normal operations, a variety of organisms are entrained, including eggs and larvae of fish and shellfish occurring in Barnegat Bay or Forked River, and phytoplankton and zooplankton that contribute to the marine-estuarine food web in Barnegat Bay. The number and variety of entrained organisms vary seasonally and annually. The most commonly entrained organisms include juvenile and adult opossum shrimp (*Neomysis integer*); zoea, juvenile, and adult sand shrimp; eggs and larvae of the bay anchovy; and larvae of winter flounder.

5.3 THERMAL RELEASES

The discharge of heated water into Oyster Creek creates elevated temperatures (>86 °F [30 °C]) in the discharge canal and produces a thermal plume in Barnegat Bay that varies in extent and magnitude based on plant operation characteristics, ambient air and water temperatures, and hydrodynamic characteristics associated with wind and tide. These thermal emissions have the potential to affect food web dynamics, alter fish behavior, or produce acute or chronic impacts on temperature-sensitive species.

o

The NJDEP fact sheet (NJDEP 2005a) identified the following thermal surface-water quality standards applicable to OCNGS operations:

- Ambient water temperatures in the receiving waters shall not be raised by more than 4 °F (2.2 °C) from June through August, nor more than 1.5°F (0.8°C) from June through August, nor cause temperature to exceed 85°F (29.4°C), except in designated heat dissipation areas.
- Heat dissipation in streams (including saline estuarine waters) shall not exceed one-quarter of the cross section and/or volume of the water body at any time; nor more than two-thirds of the surface from shore to shore at any time.

Interruption of the flow of heated water from the plant, or failure of the dilution pump system, has resulted in a number of fish kills since OCNGS began operating in 1969. Fish kills associated with thermal fluctuations from 1972 to 1982 are summarized in Kennish (2001). Additional details on fish kills related to thermal fluctuations at OCNGS are provided in Section 4 of Supplement 28 to the GEIS (NRC 2006b).

6.0 POTENTIAL EFFECTS OF THE PROPOSED ACTION ON DESIGNATED ESSENTIAL FISH HABITAT OF MANAGED SPECIES

6.1 EVALUATION OF SPECIES REQUIRING EFH CONSULTATION

During the development of this EFH assessment, NMFS websites (NMFS 2006a,b,c) were consulted to develop an initial list of candidate fish species that would be considered for EFH consultation. Because Barnegat Bay encompasses four different 10-minute × 10-minute grids for EFH habitats in addition to the Barnegat Bay complex (Table 1), the initial candidate species list includes organisms living in nearshore estuarine and oceanic habitats (Table 2). During the initial review of life history and EFH requirements for each candidate species, some species or life stages were eliminated from further consideration based on salinity or depth requirements, or life history information that suggested that the appearance of some species or life stage is unlikely in Barnegat Bay, Oyster Creek, or Forked River (Table 3). Table 4 gives the final list of species and life stages that were evaluated in this EFH assessment.

Table 1. Essential Fish Habitat Areas Associated with Barnegat Bay

North	East	South	West	Web Address
40° 10.0'N	74° 0.00'W	40° 00.0'N	74° 10.0'W	http://www.nero.noaa.gov/hcd/STATES4/new_jersey/40007400.html
40° 00.0'N	74° 0.00'W	39° 50.0'N	74° 10.0'W	http://www.nero.noaa.gov/hcd/STATES4/new_jersey/39507400.html
39° 50.0'N	74° 10.0'W	39° 40.0'N	74° 20.0'W	http://www.nero.noaa.gov/hcd/STATES4/new_jersey/39407400.html
39° 40.0'N	74° 10.0'W	39° 30.0'N	74° 20.0'W	http://www.nero.noaa.gov/hcd/STATES4/new_jersey/39307410.html
Barnegat Bay, New Jersey				http://www.nero.noaa.gov/hcd/nj1.html

6.2 SPECIES DESCRIPTIONS AND IMPACT DETERMINATION

EFH requirements for the relevant species and life stages presented in Table 4 are discussed in this section. Species descriptions include, if available, information on fish abundance patterns in Barnegat Bay, common depth distributions, migratory and spawning habits, tolerance and preference ranges for temperature and salinity, habitat needs, and information on food preferences. For each species and life stage, OCNGS operations were evaluated to determine whether they resulted in (1) no adverse impact, (2) minimal adverse impact, or (3) substantial adverse impact on EFH. These impact categories follow the standard used by

Table 2. Initial List of Candidate Species and Life Stages Considered for Inclusion in EFH Assessment

Scientific Name	Common Name	Life Stage				Spawning Adult
		Egg	Larvae	Juvenile	Adult	
<i>Carcharhinus obscurus</i>	dusky shark		■ ^(a)			
<i>Carcharhinus plumbeus</i>	sandbar shark		■ ^(a)	■	■	
<i>Centropristis striata</i>	black sea bass			■	■	
<i>Clupea harengus harengus</i>	Atlantic sea herring			■	■	
<i>Gadus morhua</i>	Atlantic cod				■	
<i>Galeocerdo cuvier</i>	tiger shark		■ ^(a)	■		
<i>Glyptocephalus cynoglossus</i>	witch flounder	■				
<i>Hippoglossoides platessoides</i>	American plaice			■	■	
<i>Leocoraja erinacea</i>	little skate			■	■	
<i>Leucoraja ocellata</i>	winter skate			■	■	
<i>Limanda ferruginea</i>	yellowtail flounder	■	■			
<i>Lophius americanus</i>	monkfish	■	■			
<i>Merluccius bilinearis</i>	whiting	■	■	■	■	
<i>Paralichthys dentatus</i>	summer flounder		■	■	■	
<i>Peprilus triacanthus</i>	Atlantic butterfish			■		
<i>Pomatomus saltatrix</i>	bluefish			■	■	
<i>Pseudopleuronectes americanus</i>	winter flounder	■	■	■	■	■
<i>Rachycentron canadum</i>	cobia	■	■	■	■	
<i>Raja eglanteria</i>	clearnose skate			■	■	
<i>Scomberomorus cavalla</i>	king mackerel	■	■	■	■	
<i>Scomberomorus maculatus</i>	Spanish mackerel	■	■	■	■	
<i>Scophthalmus aquosus</i>	windowpane flounder	■	■	■	■	■
<i>Spisula solidissima</i>	surf clam			■	■	
<i>Stenotomus chrysops</i>	scup			■	■	
<i>Urophycis chuss</i>	red hake	■	■	■		
<i>Zoarces americanus</i>	ocean pout	■		■	■	

(a) Neonates and/or early-stage juveniles.

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Table 3. Species and Life Stages Eliminated from Consideration in EFH Assessment and Rationale for Elimination

Common Name	Life Stages Eliminated from EFH Assessment	Rationale for Elimination
American plaice	All life stages	Salinity and depth requirements not present in Barnegat Bay
Atlantic butterfish	All life stages	Depth requirements not present in Barnegat Bay
Atlantic cod	All life stages	Salinity and depth requirements not present in Barnegat Bay
Atlantic sea herring	All life stages	Salinity and depth requirements not present in Barnegat Bay
Black sea bass	Adults (juveniles retained)	Depth requirements not present in Barnegat Bay
Bluefish	Adults (juveniles retained)	Salinity requirements not present in Barnegat Bay
Cobia	All life stages	Salinity requirements not present in Barnegat Bay
King mackerel	All life stages	Salinity requirements not present in Barnegat Bay
Monkfish	All life stages	Depth requirements not present in Barnegat Bay
Ocean pout	All life stages	Salinity requirements not present in Barnegat Bay
Red hake	Juveniles (eggs and larvae retained)	Salinity requirements not present in Barnegat Bay
Spanish mackerel	All life stages	Salinity requirements not present in Barnegat Bay
Summer flounder	Larvae (juveniles and adults retained)	Depth requirements not present in Barnegat Bay
Whiting	All life stages	Depth requirements not present in Barnegat Bay
Witch flounder	All life stages	Salinity and depth requirements not present in Barnegat Bay
Yellowtail flounder	All life stages	Salinity and depth requirements not present in Barnegat Bay

Table 4. Species and Life Stages Included in EFH Consultation

Common Name	Life Stage				Spawning Adult
	Egg	Larvae	Juvenile	Adult	
Black sea bass			■		
Bluefish			■		
Clearence skate			■	■	
Dusky shark		■ ^(a)			
Little skate			■	■	
Red hake	■	■			
Sandbar shark		■ ^(a)	■	■	
Scup			■	■	
Summer flounder			■	■	
Surf clam			■	■	
Tiger shark		■ ^(a)	■		
Windowpane flounder	■	■	■	■	■
Winter flounder	■	■	■	■	■
Winter skate			■	■	

(a) Neonates and/or early-stage juveniles.

the Northeast Regional Office of the NMFS. To determine impact level, OCNCS monitoring data, scientific journal articles or technical reports, and other relevant information were reviewed.

Black Sea Bass (*Centropristis striata*)

Barnegat Bay is considered EFH for juvenile black sea bass. The shallow depth of Barnegat Bay prevents it from meeting EFH criteria for black sea bass adults. Juveniles enter the estuary in late spring and early summer after settlement has occurred in coastal waters, and move to warmer offshore or southern waters during the winter months. Juvenile young-of-the-year (YOY) are tolerant of temperatures of 43-86 °F (6 to 30 °C) and salinities of 8 to 38 ppt, but prefer temperatures of 63-77 °F (17 to 25 °C) and salinities of 18 to 20 ppt. In winter, juvenile black sea bass require water temperatures higher than 41 °F (5 °C) and prefer salinities of approximately 18 to 20 ppt (NMFS 1999a). The EFH of juvenile black sea bass includes shallow, hard-bottom substrates with structure present to provide protection and refuge. Suitable habitat includes oyster or mussel beds, seagrass beds, piers, wharves,

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artificial reefs, and cobble and shoal areas (NMFS 2006a,b,c). Juveniles do not prefer open areas, unvegetated sandy intertidal areas, or beaches. Juvenile black sea bass are diurnal, visual predators, and their diet consists of small benthic crustaceans, polychaetes, sand shrimp, amphipods, and shrimp. There is also no evidence that entrainment of prey items (e.g., sand shrimp) has significantly disrupted the population of juvenile black sea bass in Barnegat Bay. Reported losses of seagrass habitat in Barnegat Bay appear to be related to increased urbanization and possibly to alterations to Barnegat Inlet that have changed the salinity and resulted in the proliferation of algal blooms that can kill seagrass or limit light penetration and productivity (McLain and McHale 1996; BBNEP 2001; Gastrich et al. 2004). This species is not commonly impinged on OCNGS traveling screens, nor has it been identified in episodic fish kills associated with the thermal plume. Although prey items are entrained or impinged in the OCNGS cooling system, there is no indication that prey populations have been measurably affected. OCNGS operations would likely have a minimal adverse effect on juvenile black sea bass EFH.

Bluefish (*Pomatomus saltatrix*)

Barnegat Bay is considered EFH for juvenile and adult bluefish, although adults are generally not found in the bay because they require oceanic (>35 ppt) salinity. According to the NMFS (1999b), juvenile bluefish distribution over the continental shelf has not been documented; thus, it is unclear whether this life stage is estuarine-dependent. Juveniles have been observed in all estuaries within the Middle Atlantic Bight from May through October. As water temperatures cool during the autumn and winter, juveniles and adults move south. Optimum conditions for pelagic juveniles (summer cohort) include temperatures of 59 to 68 °F (15 to 20 °C) and salinities of 31 to 36 ppt. Summer cohort juveniles prefer temperatures of 68 to 86 °F (20 to 30 °C) and salinities of 23 to 33 ppt. Bluefish are known to be voracious predators and appear to eat whatever prey items are abundant, including small fish, polychaetes, and crustaceans. It is likely that the juvenile summer-spawned cohort uses Barnegat Bay as a nursery area (Tatham et al. 1984). Although juvenile bluefish are among the species that have been killed by thermal shock associated with OCNGS operations (Kennish 2001), the number of fish kills has declined dramatically over the past decade because of improved procedures. There is no evidence that large numbers of juvenile bluefish are impinged on the OCNGS cooling system traveling screens, nor is there evidence that entrainment or impingement of prey items at OCNGS has resulted in a detectable disruption of the food web in Barnegat Bay (EA 1986; Summers et al. 1989). It appears that OCNGS operations would likely have a minimal adverse effect on bluefish EFH.

Clearnose Skate (*Raja eglanteria*)

On the basis of the distribution patterns described by NMFS (2006c), Barnegat Bay may provide EFH for juvenile and adult clearnose skates. Little information is available to determine whether juveniles and adults frequent Barnegat Bay. However, there is some evidence that they enter

the coastal waters of New Jersey during the spring and early summer and move offshore and southward as the water cools during the autumn and winter (NMFS 2003a). Tatham et al. (1984) considered the clearnose skate as a local marine stray in Barnegat Bay. Clearnose skates occur over a relatively large temperature range (48 to 86 °F [9 to 30 °C]) and have been found in water with salinity ranging from 6 to greater than 35 ppt (NMFS 2003a). The optimum temperature for both juveniles and adults appears to be approximately 48 to 68°F (9 to 20 °C), and the optimum salinity appears to range from 31 and 35 ppt. Skates are often found on soft-bottom habitats along the continental shelf and have been caught in water depths ranging from approximately 1 to 300 m; they are most common in waters ranging from about 5 to 20 m. Juveniles and adults generally move inshore and northward during the spring and early summer, and offshore and southward during the autumn and early winter. Juvenile and adult clearnose skates are not commonly impinged on the OCNGS traveling screens, nor is there evidence to suggest that clearnose skates make significant use of the estuary for reproduction or nursery activities. It is also unlikely that OCNGS operations have adversely affected EFH for this species because the operational impacts on nearshore sediments are generally restricted to Oyster Creek and Forked River (EA 1986; Summers et al. 1989). Although prey items are entrained or impinged in the OCNGS cooling system, there is no indication that prey populations have been measurably affected. OCNGS operations would likely have a minimal adverse effect on EFH for adult or juvenile clearnose skates.

Dusky Shark (*Carcharhinus obscurus*)

According to the NMFS (2006c), Barnegat Bay is designated as EFH for dusky shark neonates and early-stage juveniles. Shallow bays and estuaries are used as nursery areas for young sharks. After giving birth, females leave the estuary (FMNH 2006a). Adults are considered highly migratory (NMFS 2006d) and generally move north during the summer and south during the winter. Adults avoid low-salinity conditions and rarely enter estuaries. This species was not identified in Barnegat Bay by Tatham et al. (1984). EFH for neonates and early-stage juveniles is considered to be shallow coastal waters, inlets, and estuaries to depths of approximately 25 m (NMFS 2006d), and it appears that the young sharks are tolerant of both temperature and salinity extremes common to estuaries. Because recently born sharks are approximately one m in length, their diet is assumed to be similar to adults and includes a variety of fish and invertebrates occurring near the bottom. This species was not commonly impinged (EA 1986; Summers et al. 1989), and dusky sharks have not been found in OCNGS fish kills. Although prey items are entrained or impinged in the OCNGS cooling system, there is no indication that prey populations have been measurably affected. OCNGS operations would likely have a minimal adverse effect on EFH for neonates and early-stage juveniles.

Little Skate (*Leocoraja erinacea*)

On the basis of the distribution patterns presented in NMFS 2006c, Barnegat Bay likely contains EFH for juvenile and possibly adult little skates. Adults and juveniles generally move into shallow coastal areas and estuaries during the spring and summer, and into deeper water during the winter. They may also leave estuaries for deeper waters during warm summer months (NMFS 2003b). Juvenile skates are generally found in water depths ranging from 1 to 400 m, but are most common in depths of 5 to 8 m. They are able to tolerate temperatures ranging from 32 to 45 °F (0 to 7 °C) in the winter and 57 to 72 °F (14 to 22 °C) in the summer, and salinity ranging from approximately 15 to 35 ppt. Adults and juveniles collected from the New York Bight were found at a mean temperature of 47 °F (8.5 °C) and a mean salinity of 32 ppt (NMFS 2003b). Preferred prey items for adult and juvenile little skates include decapod crustaceans and amphipods. Fish and squid are also eaten. On the basis of studies of the OCNGS once-through cooling system, entrainment of early life stages of fish and invertebrates has not adversely affected the prey items of Barnegat Bay that could potentially support juvenile and adult skates, nor is this species commonly impinged on the traveling screens associated with the cooling-water intakes. Although fish kills due to thermal fluctuations have occurred, little skate was not among the species killed. OCNGS operations would likely have a minimal adverse effect on EFH for juvenile and adult little skate.

Red Hake (*Urophycis chuss*)

Barnegat Bay is considered EFH for eggs and larvae of the red hake. Red hake are demersal fish common along the New Jersey coastline. Spawning adults are known to frequent coastal ports, and spawning occurs from about April to November at temperatures between 41 and 50 °F (5 and 10 °C) (NMFS 1999c). Eggs are about 0.6 to 1.0 mm in diameter and float near the water surface. EFH for red hake eggs includes surface waters of the middle Atlantic region at sea surface temperatures below 50 °F (10 °C) and salinities of less than 25 ppt. Eggs are usually observed from May to November, with peak densities during June and July (NMFS 2006a,c). Temperature dependent hatching occurs at temperatures ranging from 37 to 45 °F (3 to 7 °C). Larvae of red hake are less than 2.0 mm at hatching and dominate the ichthyoplankton during the late summer months in the Middle Atlantic Bight (NMFS 1999c). EFH for larval red hake includes surface waters of the middle Atlantic region at depths less than 200 m, temperatures less than 66 °F (19 °C), and salinities greater than 0.5 ppt. Larvae are observed from May to December, with peak densities in September and October (NMFS 2006b). Larvae are nocturnal feeders that prey upon copepods and other microcrustaceans. On the basis of results of the 316(b) demonstration study at OCNGS (EA 1986; Summers et al. 1989), eggs and larvae of red hake were not identified in entrainment samples at OCNGS, nor is there evidence that entrainment or thermal fluctuations associated with the facility have resulted in a detectable disruption of food web dynamics in the estuary with respect to the presence and abundance of microcrustacean prey items. OCNGS operations would likely have a minimal adverse effect on EFH for red hake eggs and larvae.

Sandbar Shark (*Carcharhinus plumbeus*)

Barnegat Bay is considered EFH for neonate, juvenile, and adult sandbar sharks. Sandbar sharks are bottom-dwelling and represent one of the most numerous shark species in the western Atlantic. EFH requirements for neonates and early juveniles (90 cm or less) include shallow coastal waters at depths reaching 25 m, and nursery areas generally located in shallow coastal waters with temperatures higher than 70 °F (21 °C) and salinities greater than 22 ppt (NMFS 2006b). EFH for late-stage juveniles and subadults (91 to 179 cm) is identified in coastal and pelagic waters near Barnegat Inlet that range in depth from 25 to 200 m (NMFS 2006c). EFH for adult sandbar sharks (>179 cm) includes shallow coastal areas to a depth of 50 m. Temperature and salinity preferences for various life stages are assumed to be typical of estuaries. Sandbar sharks are opportunistic feeders, and prey items commonly include small fish, molluscs, and crustaceans. Some of these prey are commonly impinged at OCNGS. The sandbar shark was not identified as a common species in Barnegat Bay by Tatham et al. (1984), juveniles and adults are not routinely impinged on the OCNGS traveling screens (EA 1986; Summers et al. 1989), and this species has not been found in OCNGS fish kills (Kennish 2001). OCNGS operations would likely have a minimal adverse effect on EFH for this species.

Scup (*Stenotomus chrysops*)

Barnegat Bay contains EFH for the both juvenile and adult scup. Scup are considered a temperate species, with a range extending from Massachusetts to South Carolina, and are common in the summer and early fall in coastal estuaries containing both open and structured environments (NMFS 1999d). Tatham et al. (1984) considered scup a local marine stray in Barnegat Bay. Juveniles are found in water depths ranging from intertidal to approximately 39 m; they prefer water temperatures of approximately 61 to 70 °F (16 to 22 °C), but are found in water with temperatures higher than 45 °F (7 °C) in winter. Juveniles in estuaries are found at salinities greater than 15 ppt; those in coastal environments are found at salinities exceeding 30 ppt. The primary prey items for juveniles include small benthic invertebrates, fish eggs, and larvae. EFH for juvenile scup includes the demersal waters over the continental shelf and estuaries where juvenile scup are abundant. In estuaries like Barnegat Bay, juveniles are commonly found in sandy and muddy environments, near mussel and eelgrass beds where water temperatures are higher than 45 °F (7 °C) and salinities are greater than 15 ppt. In summer, adult scup are found in water depths of approximately 2 to 38 m, at temperatures ranging from 45 to 77 °F (7 to 25 °C), and at salinities greater than 15 ppt. In winter, adults are generally found offshore in water depths ranging from 38 to 185 m, water temperatures higher than 45 °F (7 °C), and salinities exceeding 30 ppt (NMFS 2006b). Adult scup feed on small benthic invertebrates and small fish. EFH for adult scup is similar to that described for juveniles. Fish kills at OCNGS have included scup, but fewer than 10 individuals were killed per event. Previous studies and the conclusions of Kennish (2001) indicate that there is no evidence that OCNGS operations have resulted in detectable changes in scup prey populations. On the basis of work by Tatham et al. (1984), scup were not abundant in Barnegat

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Bay during the 1980s, nor were they commonly entrained at OCNGS (EA 1986; Summers et al. 1989). OCNGS operations would likely have a minimal adverse effect on EFH for scup juveniles and adults.

Summer Flounder (*Paralichthys dentatus*)

Barnegat Bay is considered EFH for summer flounder juveniles and adults. Summer flounder are common in coastal and estuarine waters from Nova Scotia to Florida; the highest abundances are associated with waters of the Middle Atlantic Bight (NMFS 1999e). Tatham et al. (1984) considered this species a warmwater migrant in Barnegat Bay. Summer flounder exhibit a strong seasonal migration pattern that finds them in shallow coastal and estuarine waters during the spring and summer, and in deeper offshore waters during the fall and winter. EFH for juveniles includes demersal waters over the continental shelf, and estuaries where juveniles have been observed. Nursery habitat used by juvenile flounder in Barnegat Bay includes salt marsh creeks, seagrass beds, mudflats, and open bay areas. Preferred water temperature is higher than 37 °F (3 °C), and preferred salinities range from 10 to 30 ppt. EFH for adult summer flounder includes demersal waters over the continental shelf at water depths to 152 m and coastal systems similar to Barnegat Bay (NMFS 2006c). Juvenile and adult summer flounder are opportunistic feeders; juveniles appear to prefer crustaceans and polychaetes, while larger individuals appear to prefer crustaceans and fish. The primary impacts of OCNGS operations on summer flounder EFH are expected to be impingement of juveniles and adults on OCNGS traveling screens, and impacts associated with the OCNGS thermal discharges. Annual summer flounder impingements ranged from 1308 to 4266 individuals. This represented less than 0.2 percent of the total number of individual fish impinged during that period and was considered inconsequential by EA (1986), given the number of fish caught by recreational anglers during that period. Fish kills associated with thermal fluctuations at OCNGS did not include summer flounder (Kennish 2001). Also, there is no evidence to suggest that the operation of the facility has significantly affected the prey of this species (EA 1986; Summers et al. 1998). Thus, OCNGS operations would likely have a minimal adverse effect on EFH for this species.

Surf Clam (*Spisula solidissima*)

The coastal region adjacent to Barnegat Bay is considered EFH for juvenile and adult surf clams. Both adults and juveniles are found along the Atlantic Coast from the Gulf of St. Lawrence to Cape Hatteras, from the beach zone to a water depth of approximately 60 m (FWS/DOI/USACE 1983; Weinberg 2000; NJDEP 2005b). The species prefers oceanic salinities (>32 ppt) and temperatures ranging from 59 to 86 °F (15 to 30 °C). Both juveniles and adults are filter-feeders, and their diet consists of a variety of algae associated with the sediment surface and the water column. EFH for juveniles and adults includes substrates to a depth of one m below the water-sediment interface in waters from the eastern edge of Georges Bank and the Gulf of Maine through the Atlantic Exclusive Economic Zone, in areas that

encompass the top 90 percent of all ranked 10-minute squares for the areas where surf clams were caught during the Northeast Fisheries Science Center surf clam and ocean quahog dredge surveys (NMFS 2006c). Because surf clams are known to burrow in medium to coarse sand and gravel substrates, they may occur in Barnegat Bay near the Barnegat Inlet. It is unlikely that OCNGS operations impact the EFH or food supply of surf clams because they are generally found in coastal rather than estuarine waters. Surf clam larvae have not been reported in OCNGS entrainment samples, and hydrodynamic modeling indicates that the OCNGS thermal plume does not extend to Barnegat Inlet (EA 1986). Although the number of surf clams appears to have decreased since 1996, a variety of factors are likely responsible for the decline, including a change in ambient water temperature due to a warm water intrusion over the mid-Atlantic shelf. This intrusion may be responsible for the mortality of larger clams, and the gradual northward shift of the population (Weinberg 2000). In conclusion, no adverse effect on surf clam EFH is expected from continued OCNGS operations.

Tiger Shark (*Galeocerdo cuvier*)

Barnegat Bay is considered EFH for neonate and juvenile tiger sharks (NMFS 2006b). This species is common throughout the world in temperate waters and exhibits a high tolerance for many different kinds of marine habitats, including rivers, estuaries, harbors, and other nearshore locations where there are numerous prey items (FMNH 2006b). Adults migrate north from tropical to temperate waters during the summer months and return to the tropics during the winter. Mating occurs between March and May, and young are born between April and June of the following year. EFH for neonates and juveniles includes shallow coastal waters to a depth of 200 m from Cape Canaveral, Florida, to offshore Montauk, Long Island, New York (NMFS 2006c). Adults are known to feed on a variety of fish and invertebrates, and it is assumed that juveniles share this characteristic. Juveniles are not routinely impinged on the traveling screens associated with the circulating-water cooling system, nor is there evidence to suggest that plant operations have significantly affected prey populations (Kennish 2001). OCNGS operations would likely have a minimal adverse effect on EFH of the tiger shark.

Windowpane Flounder (*Scophthalmus aquosus*)

Barnegat Bay is considered EFH for all life stages of the windowpane flounder, including spawning adults (NMFS 2006b). This species occurs in estuaries, nearshore waters, and waters associated with the continental shelf along the Atlantic Coast from the Gulf of St. Lawrence to Florida, and is most abundant in water depths of two m or less (NMFS 1999f). Eggs are buoyant and are typically found in surface waters, with greatest abundance between May and October. Larvae are approximately 2 mm long at hatching, and metamorphose into juvenile forms when they reach a length of approximately 5.5 mm; they settle to the bottom when they reach a total length of approximately 10 mm (Bigelow and Schroeder 1953). Juveniles typically reach a size range of 11 to 19 cm about 4 months after spawning, and the total length of adults is about 46 cm (NMFS 1999f). Adults generally spawn from February to December, with peak

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spawning occurring in May in the middle-Atlantic region (NMFS 2006a). Juvenile and adult windowpane flounder feed on small crustaceans (mysid shrimp and decapods) and larval forms of fish.

EFH for eggs includes surface waters extending from the Gulf of Maine to Cape Hatteras. Optimum water temperatures are less than 68 °F (20 °C) and water depths of less than 70 m (NMFS 2006c). EFH for larvae is similar to that described for eggs. EFH for juvenile windowpane flounder includes mud or fine-grained sand substrates with water temperatures below 77 °F (25 °C), depths of 1 to 100 m, and salinities between 5.5 and 36 ppt (NMFS 2006c). EFH for adults is similar to that described for juveniles, with water temperatures below 81 °F (27 °C). Spawning adults in the mid-Atlantic region prefer habitats with mud or fine-grained sand, water temperatures below 70 °F (21 °C), salinities ranging from 5.5 and 36 ppt, and water depths ranging from 1 to 75 m. The peak spawning period is May (NMFS 2006c).

Because all life stages of windowpane flounder could occur in Barnegat Bay, it is possible that OCNCS activities could adversely affect EFH for this species. Tatham et al. (1984) considered the windowpane flounder a local marine stray and did not consider it to be an abundant species based on trawl studies in the study area from 1975 to 1978, nor was it designated as a species that uses the estuary for spawning or as a nursery area. On the basis of commercial landing data for this species for the state of New Jersey provided by the NMFS (2005), commercial landings of windowpane flounder during the Tatham et al. study period ranged from 0 to 0.6 metric tons, and were less than 4.5 metric tons from 1971 to 1996. This could account for the low abundances of this species in Barnegat Bay. Commercial landings in New Jersey increased dramatically after 1996, peaking at 51 metric tons in 2001. Commercial landings of windowpane flounder have declined since 2001 and accounted for 16.9 metric tons in 2004 (NMFS 2005).

The results of studies conducted at OCNCS between 1965 and 1977 suggest that eggs and larvae of windowpane flounder are not commonly entrained, and there was no evidence of significant impingement of this species during that time (EA 1986; Summers et al. 1989). In addition, this species has not been found in fish kills resulting from OCNCS operations (Kennish 2001). Unfortunately, most of the relevant information collected to determine potential OCNCS impacts occurred during a period of low abundance of this species (NMFS 2005). Detailed abundance, entrainment, and impingement data are not available for Barnegat Bay during years when commercial landings were at historical highs (1997 to 2004). Therefore, it is not possible to quantify EFH impacts for this species during that period. Despite this, it appears likely that the general conclusions stated in EA (1986), Summers et al. (1989), and Kennish (2001) are still valid. All three sources concluded that the operation of OCNCS did not result in a discernable effect on invertebrate or fish communities in Barnegat Bay. OCNCS operations are expected to result in a minimal adverse effect on EFH for windowpane flounder eggs, larvae, juveniles, adults, and spawning adults.

Winter Flounder (*Pseudopleuronectes americanus*)

Barnegat Bay is considered EFH for all lifestages of the winter flounder, including spawning adults. Winter flounder represent a valuable recreational and commercial resource along the Atlantic Coast; this species is ubiquitous in inshore areas from Massachusetts to New Jersey (NMFS 1999g). Winter flounder eggs are adhesive and occur in clusters. Larval forms are initially planktonic and begin to settle to the bottom when they reach a length of approximately 9 to 13 mm. In New Jersey waters, YOY and juvenile winter flounder are found in shallow water, where they may grow from 0.23 to 0.47 mm per day (NMFS 1999g). Adults can grow to a length of 58 cm and may live up to 15 years. Adults enter nearshore estuaries and rivers during the fall and early winter and spawn in late winter and early spring. After spawning, adults typically leave inshore areas. Winter flounder larvae eat small planktonic organisms (copepods, eggs, and phytoplankton); juveniles and adults are opportunistic feeders, and their diets include polychaetes and crustaceans. EFH for winter flounder eggs consists of bottom habitats with sand, muddy sand, and gravel substrates; a depth range of 0.3 to 4.5 m, an optimum temperature range of 37 to 41 °F (3 to 5 °C), and a preferred salinity range of 10 to 32 ppt (NMFS 1999g; NMFS 2006a). EFH for larvae includes shallow (1 to 4.5 m) inshore areas with a fine sand to gravel substrate, temperatures of 36 to 59 °F (2 to 15 °C), and a salinity range of 3.2 to 30 ppt. YOY and juveniles prefer a habitat consisting of mud or sand (with shell fragments) and water depths ranging from approximately 0.5 to 27 m. Preferred temperatures range from 36 to 84 °F (2 to 29 °C) for YOY and from 50 to 77 °F (10 to 25 °C) for juveniles. Preferred salinity ranges are approximately 23 to 33 ppt for YOY and 19 to 21 ppt for juveniles. Adult winter flounder are typically found in 1 to 30 m of water with a mud, sand, or large cobble substrate. The preferred water temperature range is 54 to 59 °F (12 to 15 °C), and the preferred salinity range is 15 to 33 ppt.

OCNGS operations have the potential to adversely affect EFH for all life stages of winter flounder because all stages could occur in Barnegat Bay. Tatham et al. (1984) considered the winter flounder a resident species in Barnegat Bay that made significant use of the estuary for spawning and as a nursery area; the years of study (1975 to 1978) reflected a period when commercial landings in New Jersey waters ranged from 47.7 to 92.7 metric tons. These data appear to reflect a low point in the population based on data from 1979 to 2004, when catches usually exceeded 100 metric tons and were greater than 200 metric tons for seven years during that period (NMFS 2005). Winter flounder larvae represented between 1 and 10 percent of the annual OCNGS entrainment measured in studies from 1975 to 1981 (Summers et al. 1989). Juvenile and adult opossum shrimp represented the largest percentage of organisms entrained during that period (49 to 91 percent). The total number of entrainment losses for winter flounder larvae for 1975 to 1976, 1977 to 1978, and 1980 to 1981 was 4330 million organisms (Summers et al. 1989). Opossum shrimp entrainment losses during this same period were 209,889 million organisms (Summers et al. 1989). Winter flounder are also impinged on the OCNGS traveling screens. Annual impingement of winter flounder from 1975 to 1985 ranged from 8908

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individuals in 1975 to 1976, to more than 148,000 individuals from 1978 to 1979), and the average annual impingement was estimated (EA 1986) to be 38,866 individuals during that period. These totals represented less than 1.5 percent of the total impingements observed at the facility during the study period (sand shrimp and blue crab accounted for the majority of the impingements) and less than 1 percent of the total population in Barnegat Bay during that time. It is likely the winter flounder impingement losses are actually lower than those described in EA (1986) because they did not reflect the high survival observed in impinged organisms (77 to 94 percent) (Summers et al. 1989). Although thermal fluctuations associated with OCNCS operations have caused significant fish kills, winter flounder have not been among the affected species (Kennish 2001).

On the basis of the results of OCNCS studies (EA 1986; Summers et al. 1989) and the results reported in Kennish (2001), OCNCS operations have not resulted in discernable changes in invertebrate or fish communities in Barnegat Bay. OCNCS does not appear to adversely affect winter flounder egg EFH, since the eggs are demersal, adhesive, and occur in clusters. OCNCS operations would likely have a minimal adverse effect on EFH for larvae, juveniles, adults, and spawning adults of the winter flounder.

Winter Skate (*Leucoraja ocellata*)

On the basis of the distribution patterns described in NMFS (2006c), Barnegat Bay may provide EFH for both juvenile and adult winter skate. This species is common along the Atlantic Coast, with a range extending from the Gulf of St. Lawrence to Cape Hatteras. The population center is believed to be on Georges Bank (NMFS 2003c). EFH for juvenile and adult winter skates includes sand- and gravel-bottom substrates at depths of up to 300 m. During the spring, juveniles are found in water temperatures ranging from 34 to 54 °F (1 to 12 °C), with the majority occurring in temperatures of 39 to 41 °F (4 to 5 °C) and a salinity range of 32 to 33 ppt. During the fall, juveniles occur in water temperatures ranging from 41 to 70 °F (5 to 21 °C), with peak abundances observed at 59 °F (15 °C) and in salinities of 32 and 33 ppt (NMFS 2003c). Adult winter skates are found year round at temperatures ranging from 36 to 52 °F (2 to 11 °C) and depths ranging from 31 to 60 m. Adults are typically found at salinities ranging from 30 to 36 ppt. Juvenile and adult winter skates are bottom feeders and preferred prey include polychaetes and crustaceans. Crustaceans are believed to make up more than 50 percent of their diet (NMFS 2003c). Because this species generally occurs in water with salinities greater than 32 ppt, it is not likely that this species spends a significant amount of time in the western portion of Barnegat Bay. However, it may frequent the eastern portion where higher salinity exists near the Barnegat Inlet. Tatham et al. (1984) did not identify winter skate as a common species in Barnegat Bay, nor are juveniles or adults routinely impinged on OCNCS traveling screens (EA 1986; Summers et al. 1989). This species was not identified in OCNCS fish kills (Kennish 2001). Current OCNCS operations may entrain or impinge some winter skate prey, but there is no evidence that prey populations have been measurably affected. OCNCS

operations would likely have a minimal adverse effect on winter skate EFH for juveniles and adults.

7.0 MITIGATION MEASURES

Three categories of impacts related to OCNGS operations that could influence EFH are: (1) release of heated cooling water containing biocides or other chemicals; (2) entrainment of eggs, larvae, or phytoplankton and zooplankton in the water column; and (3) impingement of juveniles or adults. These operations are regulated under a NJPDES permit that is currently under review for extension to April 30, 2009. The NJDEP developed a fact sheet (NJDEP 2005a) that describes the agency's assessment of impacts and potential mitigation alternatives that may be necessary to comply with Phase II requirements of Section 316(b) of the Clean Water Act.

The existing dilution-pump system was designed to mitigate thermal effects in the discharge canal, Oyster Creek, and Barnegat Bay. Water at ambient temperature is pumped directly from the intake canal to the discharge canal where it mixes with the heated discharged water. The dilution water serves to reduce the temperature of the discharged circulation water immediately. Such temperature reduction greatly reduces any potential thermal effects on EFH in the discharge canal, Oyster Creek, and Barnegat Bay.

The NJDEP has granted OCNGS a variance from thermal surface-water quality standards for heat and temperature pursuant to Section 316(a) of the Clean Water Act. This variance was granted based on the assessment by Summers et al. (1989) that the operation of OCNGS did not appear to produce long-term population or ecosystem level impacts. Thus, the draft NJPDES permit does not require additional mitigation measures for thermal discharges beyond those already stipulated in the existing permit, which include temperature monitoring at various locations near OCNGS and plant shutdown restrictions during December, January, February, and March to reduce the possibility of fish kills related to cold shock.

Current mitigation measures also are in place to reduce effects of impingement on EFH in Barnegat Bay, Forked River, and the intake canal. In 1984, the circulating-water intake was fitted with 3/8-in.-mesh traveling screens with Ristroph buckets and a screen-wash and fish-return system. Impinged organisms are washed into or fall into the buckets; the buckets deliver the organisms into the fish-return system, which transports them to the discharge canal where the dilution water enters the canal. Such mitigation measures greatly reduce the effects of impingement on EFH, including various life stages of prey species, in the Barnegat Bay system.

The fact sheet also addresses the impacts of entrainment and impingement by evaluating the potential losses of representative important species using three population models: equivalent adult model, production foregone model, and spawning/nursery area of consequence model. Although the NJDEP acknowledged the conclusion of Summers et al. (1989) that OCNGS

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operations did not appear to produce “unacceptable, substantial long-term population and ecosystem level impacts,” the agency stated that it is not necessary to prove that an impact on a population is occurring to trigger the 2004 EPA Phase II Section 316(b) requirements. The NJDEP went on to state that “this rationale is consistent with the Phase II regulations which specify compliance alternatives, including national performance standards, and do not define adverse environmental impact.” The National entrainment performance standard requires that entrainment mortality for all life stages of fish and shellfish be reduced by 60 to 90 percent from the calculated baseline, though there is no guidance on how the baseline is to be calculated. Impingement mortality is to be reduced by 80 to 90 percent from the calculated baseline. In addition to compliance with these performance standards, the NJDEP has indicated that AmerGen should initiate a wetlands restoration and enhancement program, within the Barnegat Bay estuary, to offset any residual impingement and entrainment losses at the facility. If such mitigation were to occur, it is likely that the potential impact of OCNGS activities on EFH would be further reduced during the license renewal period.

8.0 CONCLUSION

The expected impacts of OCNGS operations on EFH is summarized in Table 5. Because OCNGS operates a once-through cooling system, it has the potential to create a substantial adverse impact on EFH due to the withdrawal of water from the Forked River and Barnegat Bay. However, the general lack of interaction between EFH species and the facility, as well as current mitigation measures in place at OCNGS, reduce the potential adverse effect on EFH. OCNGS operations do not have an adverse effect on the food web in Barnegat Bay. The NRC staff concludes that license renewal for OCNGS for an additional 20 years of operation would result in a minimal adverse effect on EFH.

Table 5. Impacts of OCNGS Operations on EFH

Species	Life Stage	EFH Description	Expected Effect of OCNGS Operations on EFH
Black sea bass	Juveniles	Shallow water hard substrate with refuge. Temperatures of 17 to 25°C, and salinity of 18 to 22 ppt.	Minimal Adverse Effect. Probably does not frequent nearshore areas near OCNGS and not commonly impinged. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
Bluefish	Juveniles	Habitat requirements not specified. Summer cohort temperatures of 20 to 30°C, and salinity of 31 to 36 ppt.	Minimal Adverse Effect. Not commonly impinged. Some documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
Clearnose skate	Juveniles	Soft-bottom substrate. Temperatures of 9 to 20°C, and salinity of 31 to 35 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged, no documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Same as juveniles	Minimal Adverse Effect. Same as juveniles.
Dusky shark	Neonates and juveniles	Shallow coastal waters to 25 m. Temperature of about 19°C, and salinity of >30 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged, no documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
Little skate	Juveniles	Shallow coastal water and estuaries (5 to 8 m). Temperatures of 0 to 7°C (winter), and 14 to 22°C (summer). Salinity of 15 to 35 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged, no documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Same as juveniles.	Minimal Adverse Effect. Same as juveniles.
Red hake	Eggs	Surface waters of mid-Atlantic region. Temperature of <10°C, and salinity of <25 ppt.	No Adverse Effect. Not commonly entrained.
	Larvae	Surface waters of mid-Atlantic region. Temperature of <19°C, and salinity of >0.5 ppt.	Minimal Adverse Effect. Not commonly entrained. Prey items are entrained at OCNGS, but prey population size not affected.

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Table 5. (contd)

Species	Life Stage	EFH Description	Expected Effect of OCNGS Operations on EFH
Sandbar shark	Neonates and juveniles	Shallow coastal waters (25 to 200 m). Temperature of >21°C, and salinity of >22 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged, no documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Shallow coastal waters (<50 m). Temperature and salinity similar to coastal estuaries with oceanic influence.	Minimal Adverse Effect. Same as juveniles.
Scup	Juveniles	Sandy or muddy habitat. Temperature of >7°C, and salinity of >15 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged. Some documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Same as juveniles.	Minimal Adverse Effect. Same as juveniles.
Summer flounder	Juveniles	Coastal estuaries with seagrass, mudflats, or open areas. Temperature of >3°C, and salinity 10 to 30 ppt.	Minimal Adverse Effect. Some annual impingement mortality, but no observed population impacts. No documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Demersal waters over continental shelf, oceanic conditions.	Minimal Adverse Effect. Same as juveniles.
Surf clam	Juveniles	Coastal water in medium and coarse sand/gravel at water depths to 60 m.	No Adverse Effect. Limited distribution in Barnegat Bay. Prey abundance probably not influenced by operations.
	Adults	Same as juveniles.	No Adverse Effect. Same as juveniles.
Tiger shark	Neonates and juveniles	Shallow coastal waters to a depth of 200 m.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged. No documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
Windowpane flounder	Eggs	Surface water with temperatures <20°C.	Minimal Adverse Effect. Limited distribution in Barnegat Bay. Eggs not commonly entrained.

Table 5. (contd)

Species	Life Stage	EFH Description	Expected Effect of OCNGS Operations on EFH
Winter flounder	Larvae	Same as eggs.	Minimal Adverse Effect. Limited distribution in Barnegat Bay. Larvae not commonly entrained. Prey items are entrained at OCNGS, but prey population size not affected.
	Juveniles	Mud or fine-grained sand habitat at depths of 1 to 100 m. Temperature of <25°C, and salinity of 5.5 to 36 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged. No documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Mud or fine-grained sand habitat at depths of 1 to 75 m. Temperature of <26.8°C, and salinity of 5.5 to 36 ppt.	Minimal Adverse Effect. Same as juveniles.
	Spawning adults	Mud or fine-grained sand habitat at depths of 1 to 75 m. Temperature of <21°C, and salinity of 5.5 to 36 ppt.	Minimal Adverse Effect Same as juveniles.
	Eggs	Sand, muddy sand, and gravel habitat with depths of 0.3 to 4.5 m. Temperatures of 3 to 5°C, and salinity of 10 to 32 ppt.	No Adverse Effect Eggs demersal and adhesive. Not reported from entrainment samples.
	Larvae	Shallow (1 to 4.5 m) inshore areas with fine sand to gravel substrate. Temperatures of 3 to 5°C, and salinity of 10 to 32 ppt.	Minimal Adverse Effect. Some annual entrainment loss. No documented thermal shock mortality. Prey items entrained at OCNGS, but prey population size not affected.
	Juveniles	Mud or sand habitat with shell hash. Water depths of 0.5 to 27 m, temperatures of 2 to 29°C, and salinity of 19 to 33 ppt.	Minimal Adverse Effect. Some annual impingement loss, but no documented thermal shock mortality. Prey items are entrained or impinged at OCNGS, but prey population size not affected.
	Adults	Mud, sand, or large cobble substrate, depths of 1 to 30 m. Temperatures of 12 to 15°C, and salinity of 15 to 33 ppt.	Minimal Adverse Effect. Same as juveniles.
	Spawning adults	Same as adults.	Minimal Adverse Effect. Same as juveniles.

Table 5. (contd)

Species	Life Stage	EFH Description	Expected Effect of OCNCS Operations on EFH
Winter skate	Juveniles	Sand and gravel substrates to 300 m. Springtime temperatures of 4 to 5°C, and salinities of 28 to 32 ppt. Fall temperatures of 5 to 21°C, with peak abundance at 15°C, and salinities of 31 to 35 ppt.	Minimal Adverse Effect. Not common in Barnegat Bay or commonly impinged. No documented thermal shock mortality. Prey items are entrained or impinged at OCNCS, but prey population size not affected.
	Adult	Sand and gravel substrates to 300 m. Springtime temperatures of 4 to 5°C and salinities of 28 to 32 ppt. Fall temperatures of 5 to 21°C, with peak abundance at 15°C and salinities of 31 to 35 ppt.	Minimal Adverse Effect. Same as juveniles.

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Appendix F

Generic Environmental Impact Statement Environmental Issues Not Applicable to Oyster Creek Nuclear Generating Station

Appendix F

Generic Environmental Impact Statement Environmental Issues Not Applicable to Oyster Creek Nuclear Generating Station

Table F-1 lists those environmental issues listed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) (NRC 1996, 1999)^(a) and Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51), Subpart A, Appendix B, Table B-1, that are not applicable to Oyster Creek Nuclear Generating Station (OCNGS) because of plant or site characteristics.

Table F-1. GEIS Environmental Issues Not Applicable to OCNGS

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
SURFACE-WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)			
Altered thermal stratification of lakes	1	4.2.1.2.2; 4.4.2.2	OCNGS does not use surface water from lakes.
Water-use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	2	4.3.2.1; 4.4.2.1	The OCNGS cooling system does not use cooling ponds or cooling towers.
AQUATIC ECOLOGY (FOR ALL PLANTS)			
Premature emergence of aquatic insects	1	4.2.2.1.7, 4.4.3	OCNGS is located on an estuary and cooling water is too saline to support aquatic insects.

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the “GEIS” include the GEIS and its Addendum 1.

Table F-1. (contd)

ISSUE–10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
AQUATIC ECOLOGY (FOR PLANTS WITH COOLING-TOWER-BASED HEAT-DISSIPATION SYSTEMS)			
Entrainment of fish and shellfish in early life stages	1	4.3.3	OCNGS does not use a cooling tower.
Impingement of fish and shellfish	1	4.3.3	OCNGS does not use a cooling tower.
Heat shock	1	4.3.3	OCNGS does not use a cooling tower.
GROUNDWATER USE AND QUALITY			
Groundwater-use conflicts (potable and service water, and dewatering; plants that use >100 gpm)	2	4.8.1.1; 4.8.2.1	OCNGS does not use >100 gpm of groundwater.
Groundwater-use conflicts (plants using cooling towers withdrawing makeup water from a small river)	2	4.8.1.3; 4.4.2.1	OCNGS does not use a cooling tower.
Groundwater-use conflicts (Ranney wells)	2	4.8.1.4	OCNGS does not use Ranney wells.
Groundwater-quality degradation (Ranney wells)	1	4.8.2.2	OCNGS does not use Ranney wells.
Groundwater-quality degradation (cooling ponds in salt marshes)	1	4.8.3	OCNGS does not use a cooling pond.
Groundwater-quality degradation (cooling ponds at inland sites)	2	4.8.3	OCNGS does not use a cooling pond.

Table F-1. (contd)

ISSUE–10 CFR Part 51, Subpart A, Appendix B, Table B-1	Category	GEIS Sections	Comment
TERRESTRIAL RESOURCES			
Cooling-tower impacts on crops and ornamental vegetation	1	4.3.4	OCNGS does not use a cooling tower.
Cooling-tower impacts on native plants	1	4.3.5.1	OCNGS does not use a cooling tower.
Bird collisions with cooling towers	1	4.3.5.2	OCNGS does not use a cooling tower.
Cooling pond impacts on terrestrial resources	1	4.4.4	OCNGS does not use a cooling pond.
HUMAN HEALTH			
Microbial organisms (occupational health)	1	4.3.6	OCNGS does not use a cooling tower.
Microbial organisms (public health) (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river).	2	4.3.6	This issue is related to heat-dissipation systems that are not installed at OCNGS.

F.1 References

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

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Appendix G

NRC Staff Evaluation of Severe Accident Mitigation Alternatives for Oyster Creek Nuclear Generating Station in Support of License Renewal Application

Appendix G

NRC Staff Evaluation of Severe Accident Mitigation Alternatives for Oyster Creek Nuclear Generating Station in Support of License Renewal Application

Section 51.53(c)(3)(ii)(L) of Title 10 of the *Code of Federal Regulations* (10 CFR) requires that license renewal applicants consider alternatives to mitigate severe accidents if the U.S. Nuclear Regulatory Commission (NRC) staff has not previously evaluated severe accident mitigation alternatives (SAMAs) for the applicant's plant in an Environmental Impact Statement (EIS) or related supplement or in an environmental assessment. The purpose of this consideration is to ensure that plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance are identified and evaluated. SAMAs have not been previously considered for Oyster Creek Nuclear Generating Station (OCNGS); therefore, the remainder of Appendix G addresses those alternatives.

G.1 Introduction

AmerGen Energy Company, LLC (AmerGen), submitted an assessment of SAMAs for OCNGS as part of the Environmental Report (ER) (AmerGen 2005). This assessment was based on the most recent OCNGS Probabilistic Risk Assessment (PRA) available at that time, a plant-specific offsite consequence analysis performed with the MELCOR Accident Consequence Code System 2 (MACCS2) computer code, and insights from the OCNGS Individual Plant Examination (IPE) (GPU Nuclear 1992) and Individual Plant Examination of External Events (IPEEE) (GPU Nuclear 1995). In identifying and evaluating potential SAMAs, AmerGen considered SAMAs that addressed the major contributors to core damage frequency (CDF) and large early release frequency (LERF) at OCNGS, as well as SAMA candidates for other operating plants that have submitted license renewal applications. AmerGen identified 136 potential SAMA candidates. This list was reduced to 37 unique SAMA candidates by eliminating SAMAs that are not applicable to OCNGS because of design differences, required extensive changes that would involve implementation costs known to exceed any possible benefit, have already been implemented, are of low benefit, or are addressed by a similar SAMA. AmerGen assessed the costs and benefits associated with each of the potential SAMAs and concluded that several of the candidate SAMAs evaluated would be cost-beneficial.

On the basis of a review of the SAMA assessment, the NRC issued a request for additional information (RAI) to AmerGen by letter dated November 9, 2005 (NRC 2005). Key questions concerned changes to the Level 1 and Level 2 PRA model since the IPE, the PRA self-assessment performed in 2004, the multiplier used to account for external events, the reanalysis of the fire risk subsequent to the IPEEE; clarification/information on several specific

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candidate SAMAs, and the evaluation of combinations of potentially cost-beneficial SAMAs. AmerGen submitted additional information by letters dated January 9, 2006 (AmerGen 2006a), and March 15, 2006 (AmerGen 2006b). In the responses, AmerGen provided a listing of the major modifications made to the Level 1 model since the IPE, a description of the current Level 2 model, a description and summary results of the self-assessment, justification for the use of the multiplier for external events, information regarding the updated fire PRA, specific requested information for the SAMAs of interest, and the results of combining selected potentially cost-beneficial SAMAs. AmerGen's responses addressed the NRC staff's concerns.

An assessment of SAMAs for OCNGS is presented below.

G.2 Estimate of Risk for OCNGS

AmerGen's estimates of offsite risk at OCNGS are summarized in Section G.2.1. The summary is followed by the NRC staff's review of AmerGen's risk estimates in Section G.2.2.

G.2.1 AmerGen's Risk Estimates

Two distinct analyses are combined to form the basis for the risk estimates used in the SAMA analysis: (1) the OCNGS Level 1 and 2 PRA model, which is an updated version of the IPE (GPU Nuclear 1992), and (2) a supplemental analysis of offsite consequences and economic impacts (essentially a Level 3 PRA model) developed specifically for the SAMA analysis. The SAMA analysis is based on the most recent OCNGS Level 1 and 2 PRA model, referred to as the 2004B PRA model. The scope of the OCNGS PRA does not include external events.

The baseline CDF for the purpose of the SAMA evaluation is approximately 1.1×10^{-5} per year. The CDF is based on the risk assessment for internally initiated events. AmerGen did not include the contribution from external events within the OCNGS risk estimates; however, it did account for the potential risk reduction benefits associated with external events by doubling the estimated benefits for internal events. AmerGen also utilized a recently completed fire PRA to assess the risk reduction for several fire-related SAMAs. This is discussed further in Sections G.2.2 and G.6.2.

Table G-1 provides the breakdown of the CDF by initiating event. As shown in this table, events initiated by loss of offsite power (LOOP) are the dominant contributors to CDF. Although not separately reported, station blackout sequences contribute about 43 percent of the total internal events CDF (4.48×10^{-6} per year), while anticipated transient without scram (ATWS) sequences are small contributors to CDF (2.89×10^{-7} per year).

Table G-1. OCNGS Core Damage Frequency

Initiating Event	CDF (per year)	% Contribution to CDF
Loss of offsite power (LOOP)	4.2×10^{-6}	40
Manual shutdown	6.8×10^{-7}	7
Medium loss-of-coolant accident (LOCA)	6.5×10^{-7}	6
Reactor trip	5.8×10^{-7}	6
Loss of 4160-volts alternating current (VAC) Bus 1C	5.3×10^{-7}	5
Condenser bay area feedwater flood	4.9×10^{-7}	5
Loss of 4160-VAC Bus 1D	4.5×10^{-7}	4
Turbine trip	3.5×10^{-7}	3
Loss of circulating water	3.5×10^{-7}	3
Loss of feedwater	3.4×10^{-7}	3
Others	1.9×10^{-6}	18
Total CDF	1.05×10^{-5}	100

The current OCNGS Level 2 PRA model represents a significant change from the somewhat simplistic analysis that was utilized in the IPE. This update is a full Level 2 model that is stated to meet standard industry practice. The Level 1 results are initially characterized by 13 accident sequence functional classes. A separate containment event tree is used for each of the Level 1 accident classes to describe the response of the containment. The linked Level 1/Level 2 end states are then grouped into release categories based on magnitude and timing of the expected releases. The resulting release categories are then reduced to 10 consequence categories for use in consequence analyses. The fission product release fractions are obtained from the results of analyses of representative sequences for each consequence category by using version 4.0.5 of the Modular Accident Analysis Program (MAAP). The results of the Level 2 PRA are a set of consequence categories with their respective frequency and release characteristics. The results of this analysis for OCNGS are provided in Tables F-6 and F-7 of the ER (AmerGen 2005).

The offsite consequences and economic impact analyses use the MACCS2 code to determine the offsite risk impacts on the surrounding environment and public. Input for these analyses includes plant-specific and site-specific values for core radionuclide inventory, source term and release characteristics, site meteorological data, projected population distribution (within a 50-mi radius) for the year 2029, emergency response evacuation modeling, and economic data. The magnitude of the onsite impacts (in terms of cleanup and decontamination costs and occupational dose) is based on information provided in NUREG/BR-0184 (NRC 1997a).

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In its ER, AmerGen estimated the dose to the population within 50 mi of the OCNGS site to be approximately 36 person-rem per year. The breakdown of the total population dose by containment release mode is summarized in Table G-2. Containment failures within the early time frame (less than 6 hours following declaration of a general emergency) and intermediate time frame (within 6 to 24 hours following declaration of a general emergency) dominate the population dose risk at OCNGS.

Table G-2. Breakdown of Population Dose by Containment Release Mode

Containment Release Mode	Population Dose (person-rem^(a) per year)	% Contribution
Early containment failure	23.6	66
Intermediate containment failure	10.3	29
Late containment failure	1.6	4
Bypass	0.4	1
Intact containment	0.1	negligible
Total population dose	36	100

(a) One person-rem = 0.01 person-Sv.

G.2.2 NRC Staff's Review of AmerGen's Risk Estimates

AmerGen's determination of offsite risk at OCNGS is based on the following four major elements of analysis:

- The Level 1 and 2 risk models that form the basis for the 1992 IPE submittal (GPU Nuclear 1992) and the external events analyses of the 1995 IPEEE submittal (GPU Nuclear 1995),
- The major modifications to the IPE model that have been incorporated into the OCNGS PRA,
- The recent reassessment of the fire portion of the IPEEE, referred to as the Fire PRA (FPRA), and
- The MACCS2 analyses performed to translate fission product source terms and release frequencies from the Level 2 PRA model into offsite consequence measures.

Each of these analyses was reviewed to determine the acceptability of AmerGen's risk estimates for the SAMA analysis, as summarized below.

The NRC staff's review of the OCNGS IPE is described in an NRC report dated August 2, 1994 (NRC 1994). On the basis of a review of the IPE submittal, the staff concluded that the IPE submittal met the intent of Generic Letter (GL) 88-20; that is, the IPE was of adequate quality to be used to look for design or operational vulnerabilities. The NRC staff did note, however, that the OCNGS IPE's lack of treatment of preinitiators in the human reliability analysis might limit the IPE's usefulness in other applications. This deficiency was resolved in subsequent PRA updates. The IPE did not identify any severe accident vulnerabilities associated with either core damage or poor containment performance.

Although no vulnerabilities were identified, 15 modifications to the plant, procedures, and training were identified that had either been implemented, were to be implemented, or were being considered at the time of the completion of the IPE process. Eight of the improvements have not been completed and have been included as candidate SAMAs in the current evaluation (AmerGen 2005).

Several revisions have been made to the IPE model since its submittal. A comparison of the internal events CDF between the IPE and the 2004B PRA model indicates an increase of approximately 6.8×10^{-6} per year in the total CDF (from 3.69×10^{-6} per year to 1.05×10^{-5} per year). The increase is mainly attributed to many modeling and data changes that have been incorporated since the IPE was submitted. A summary listing of those changes that resulted in the greatest impact on the internal events CDF was provided in the ER (AmerGen 2005) and further discussed in response to an RAI (AmerGen 2006a). Table G-3 summarizes the major changes.

The IPE CDF value for OCNGS was the lowest CDF value reported in the IPE for boiling-water reactor (BWR) 1/2/3 plants. Figure 11.2 of NUREG-1560 shows that the IPE-based total internal events CDF for BWR 1/2/3 plants ranges from 3×10^{-6} to 5×10^{-5} per year (NRC 1997a). It is recognized that other plants have updated the values for CDF subsequent to the IPE submittals because of modeling and hardware changes. The current internal events CDF results for OCNGS are reasonably consistent with that for plants of similar vintage and characteristics.

The NRC staff considered the peer review performed for the OCNGS PRA, and the potential impact of the review findings on the SAMA evaluation. In the ER, AmerGen described the previous peer reviews, the most significant of which was the Boiling-Water Reactor Owners Group (BWROG) Peer Review of the 1992 PRA model (i.e., the IPE) conducted in 1997. The BWROG review concluded that the OCNGS PRA can be effectively used to support applications involving relative risk significance. AmerGen stated that all Level A (important and

Table G-3. OCNGS PRA Historical Summary

PRA Version	Summary of Changes from Prior model	CDF (per year)
1992	IPE submittal	3.69×10^{-6}
2001A	Resolution of peer review comments Inclusion of internal flooding Data update Level 2 reassessment with simplified large early release frequency (LERF) model	6.27×10^{-6}
2004B	Conversion from RISKMAN to CAFTA software platform Addition of AC and DC initiating events Addition of more detailed modeling of extreme weather and impact on AC power Addition of recirculation pump seal leakage scenario Addition of induced LOOP events for transients and LOCAs Utilized updated plant-specific failure data Extensive human reliability analysis (HRA) reassessment Revised/updated common cause failure calculations Updated and more detailed ATWS analysis LERF model upgraded to full Level 2 model	1.05×10^{-5}

necessary to address before the next regular PRA update) and Level B (important and necessary to address, but disposition may be deferred until the next PRA update) facts and observations from the peer review have been resolved by model changes. AmerGen further stated that no outstanding model issues exist outside the normal PRA maintenance program, and that none are known to have the potential to impact the SAMA conclusions.

In the ER and subsequent responses to RAIs (AmerGen 2006a,b), AmerGen describes the self-assessment process of the OCNGS PRA model and documentation performed in 2004. This review of the 2001 PRA, against the American Society of Mechanical Engineers (ASME) PRA Standard (ASME 2003) and Regulatory Guide (RG) 1.200 (NRC 2004a), identified a number of items for updating. Changes required to meet Capability Category II of the ASME Standard were then incorporated into the 2004A model. Subsequently, the 2004A model was completely reassessed against the same requirements. AmerGen indicated that most of the “gaps” relative

to the requirements have been addressed as part of the current update (i.e., the 2004B update), and that none of the remaining items are judged to affect the SAMA evaluation.

The NRC staff concludes that the Level 1 PRA model is of sufficient quality to support the SAMA evaluation because (1) the OCNCS Level 1 internal events PRA model has been both peer reviewed and subjected to an extensive self-assessment process; (2) the review findings have been resolved or judged to have no adverse impact on the SAMA evaluation; and (3) AmerGen has satisfactorily addressed NRC staff questions regarding the PRA.

As indicated above, the current OCNCS PRA (2004B) does not include external events. In the absence of such an analysis, AmerGen used the OCNCS IPEEE to identify the highest risk accident sequences and potential means of reducing the risk posed by those sequences. In addition, subsequent to the ER submittal, a FPRA has been completed. In response to NRC staff RAIs (NRC 2005, 2006), AmerGen described the use of the IPEEE and updated fire analyses to support the identification and evaluation of potential SAMAs related to external events (AmerGen 2006a,b).

The OCNCS IPEEE was submitted in December 1995, in response to Supplement 4 of GL 88-20 (GPU Nuclear 1995). GPU Nuclear, Inc., did not identify any fundamental weaknesses or vulnerabilities to severe accident risk in regard to the external events related to seismic, fire, or other external events. In a letter dated February 8, 2001, the NRC staff concluded that the submittal met the intent of Supplement 4 to GL 88-20, and that the licensee's IPEEE process is capable of identifying the most likely severe accidents and severe accident vulnerabilities (NRC 2001).

The seismic PRA performed for the initial OCNCS IPEEE submittal resulted in a seismic CDF of 3.6×10^{-6} per year. The seismic model was modified significantly as a result of the NRC IPEEE review and subsequently yielded a total seismic CDF of 4.7×10^{-6} per year. The dominant contributors to this value are failure of the turbine building and the reactor building since their failures lead directly to core damage. The seismic IPEEE assumed that all relays that did not meet USI A-46 requirements would be replaced. The NRC staff Safety Evaluation Report (SER) for USI A-46 (NRC 2000) accepted the A-46 resolution. In response to an RAI, AmerGen confirmed that all relays that did not meet A-46 requirements have been replaced or otherwise shown to be acceptable (AmerGen 2006a).

The OCNCS IPEEE fire analysis consisted of a FPRA based on Electric Power Research Institute's (EPRI's) Fire Induced Vulnerability Evaluation (FIVE) methodology (supplemented by an existing fire hazards analysis) and the IPE internal events PRA models. An initial qualitative screening phase was utilized to screen out fire areas based on a lack of risk-significant components or lack of a demand for a reactor trip. Quantitative screening of fire areas was then employed to screen out areas where the conservatively determined (neglecting fire suppression and conservatively estimating fire propagation) CDF is less than 1×10^{-6} per year. This was

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then followed by a detailed analysis that included the consideration of fire suppression, fire propagation, and fire severity factor. Eight fire areas required detailed analysis.

Based on the IPEEE, Table G-4 gives the fire areas with frequencies greater than 1×10^{-6} per year that were considered to be the dominant contributors, comprising more than 80 percent of the estimated total fire CDF.

Table G-4. Significant Fire Areas for OCNGS

Fire Area	Description	CDF (per year)
OB-FZ-4	Lower cable spreading room	8.6×10^{-6}
OB-FZ-6A	480-VAC switchgear room	5.1×10^{-6}
TB-FZ-11D	Turbine building basement	1.9×10^{-6}

The resulting total fire CDF from the IPEEE was estimated as 1.9×10^{-5} per year (NRC 2001).

Subsequent to the ER submittal, AmerGen completed a FPRA for OCNGS (AmerGen 2006a). The FPRA includes a comprehensive reanalysis of the entire plant and indicates a fire CDF of 9.4×10^{-6} per year. AmerGen stated that the reanalysis applied accepted industry methods (as documented in the EPRI Fire PRA Implementation Guide and modified by NRC generic RAIs and responses) and incorporated updated fire frequency values and fire-induced spurious actuation probabilities (AmerGen 2006b). A comparison of the results from the FPRA with those from the IPEEE was provided in response to RAIs (AmerGen 2006a,b) and is summarized below. Included are the dominant contributors to the IPEEE, as listed above, and the areas from the FPRA that have a CDF contribution of more than approximately 2.7×10^{-7} per year (which corresponds to an averted cost risk of approximately \$50,000). The major reason for the reduction in fire CDF is stated to be attributable to the more detailed treatment of fire ignition sources and incorporation of alternate mitigation measures involving the remote shutdown panel for fire area OB-FZ-4.

As Table G-5 indicates, the overall fire CDF from the IPEEE is conservative.

The IPEEE analysis of other external events (GPU Nuclear 1995) followed the screening specified in Supplement 4 to GL 88-20 (NRC 1991) and did not identify any unduly significant sequences or vulnerabilities. The plant design was reviewed to determine if it met 1975 Standard Review Plan design criteria for high winds, floods, and other external events. If it met these criteria and a walkdown did not identify any unique vulnerabilities, then the CDF from the external hazard was considered to be less than 1×10^{-6} per year. If it did not meet the criteria,

Table G-5. Comparison of FRPA and IPEEE Core Damage Frequencies

Fire Area	Description	CDF (per year)	
		IPEEE	FPRA
OB-FZ-6A	"A" 480-VAC switchgear room	5.1×10^{-6}	3.1×10^{-6}
OB-FZ-8C	A and B batt room, tunnel and elec tray room	4.6×10^{-7}	2.1×10^{-6}
TB-FZ-11E	Condenser bay	Screened	6.0×10^{-7}
TB-FA-3A	4169-VAC switchgear 1C vault	Screened	5.1×10^{-7}
OB-FZ-5	Control room	3.3×10^{-7}	4.3×10^{-7}
MT-FA-12	Main transformer and condensate storage tank	Screened	3.9×10^{-7}
OB-FZ-4	Cable spreading room	8.6×10^{-6}	3.9×10^{-7}
OB-FZ-10A	Monitoring and change room	Screened	3.8×10^{-7}
TB-FA-3B	4169-VAC switchgear 1D Vault	Screened	3.3×10^{-7}
TB-FZ-11D	Turbine building basement, south end	1.9×10^{-6}	6.2×10^{-8}

then additional analysis was performed to evaluate the specific concern. Since tornadoes were not part of the design basis for OCNGS, high winds and tornadoes could not be screened out. Further analysis summarized in the IPEEE SER (NRC 2001) indicated that the CDF due to high winds and tornadoes is less than 1×10^{-6} per year.

Based on the IPEEE results, the external events CDF (fire: 1.9×10^{-5} per year, seismic: 4.7×10^{-6} per year) is approximately 2.3 times the internal events CDF (1.05×10^{-5} per year). AmerGen argued that, in addition to the fire risk being conservatively estimated, a SAMA derived to address the internal events risk profile will have a less profound impact on the external event risk profile, and that assuming a one-to-one correspondence will overestimate the external events benefit. Therefore, in the ER, AmerGen doubled the benefit that was derived from the internal events model to account for the contribution from external events. This doubling was not applied to those SAMAs that specifically addressed external events risk (i.e., SAMAs 67, 124, 125, 130, and 134). Doubling the benefit for these SAMAs is not appropriate since these SAMAs are specific to external event risks and would not have a corresponding benefit on the risk from internal events.

As discussed above, in response to staff RAIs, AmerGen provided the results of an updated FPRA (AmerGen 2006b). The CDF from the FPRA, combined with the IPEEE seismic CDF, yields a total external events CDF of 1.41×10^{-5} per year or approximately 1.3 times the internal events CDF. The total CDF is approximately 2.3 times the CDF internal events. In the discussion provided in the response to RAIs, AmerGen argues that since seismic risk is only marginally impacted by SAMAs intended to mitigate the risk from internal events, the seismic risk should not be included in the total mitigated risk. If seismic is not included, the external

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events CDF for the purposes of SAMA evaluations is approximately 0.9 times the internal events CDF, or the total CDF is approximately 1.9 times the internal events CDF.

On the basis of the above, the NRC staff concludes that the applicant's use of a multiplier of 2 to account for external events is reasonable for the purposes of the SAMA evaluation.

The NRC staff reviewed the general process used by AmerGen to translate the results of the Level 1 PRA into containment releases, as well as the results of this Level 2 analysis. AmerGen characterized the releases for the spectrum of possible radionuclide release scenarios by using a set of release categories defined based on the timing and magnitude of the release. The frequency of each release category was obtained from the quantification of a linked Level 1/Level 2 model that effectively evaluates a containment event tree for each Level 1 accident sequence. The process for assigning accident sequences to the various release categories and the dominant accident sequences for each release category is described in the ER (AmerGen 2005). The release categories were then reduced to 10 consequence categories by combining several of the low and very low release categories. The fission product release fractions for each consequence category were obtained from the results of analyses of representative sequences for each category by using version 4.0.5 of MAAP. The frequencies and fission product release characteristics for each of the release and consequence categories are presented in Tables F-6, F-6a, and F-7 of the ER (AmerGen 2005).

While the IPE Level 2 analysis was reviewed by the NRC and found to be consistent with the intent of the IPE program (NRC 1994), the current Level 2 analysis is a significant modification of the earlier analysis. In response to RAIs, AmerGen described the development of the current model, the reviews performed, and the experience and qualifications of the team that prepared it. The IPE Level 2 model was upgraded in 2003 to a "LERF only" model. This model was included within the PRA self-assessment performed in 2004. The results of this self-assessment against the requirements of the ASME PRA Standard and RG 1.200 were then used to upgrade the 2003 model, while at the same time expanding the scope of the model to treat the spectrum of radionuclide releases. The upgraded Level 2 model was incorporated into the 2004A PRA model and then reassessed against the above requirements. The NRC staff notes that the team that developed the Level 2 model has considerable experience in Level 2 PRA analysis and has been involved in developing industry standards for such analyses. The staff concludes that the process used for determining the consequence category frequencies and source terms is reasonable and appropriate for the purposes of the SAMA analysis.

As indicated in the ER, the reactor core radionuclide inventory used in the consequence analysis is based on a plant-specific ORIGEN 2.1 calculation and corresponds to best estimate, end-of-cycle values for a 24-month fuel cycle. All releases were modeled as occurring at ground level with a thermal content the same as ambient. AmerGen assessed the impact of alternative assumptions (i.e., elevated releases for selected consequence categories). The

results of this sensitivity study showed that the 50-mi population dose and offsite economic risks would increase by less than 1 percent.

The NRC staff reviewed the process used by AmerGen to extend the containment performance (Level 2) portion of the PRA to an assessment of offsite consequences (essentially a Level 3 PRA). This included consideration of the major input assumptions used in the offsite consequence analyses. The MACCS2 code was utilized to estimate offsite consequences. Plant-specific inputs to the code include the source terms for each consequence category and the reactor core radionuclide inventory (both discussed above), site-specific meteorological data, projected population distribution within a 50-mi radius for the year 2029, emergency evacuation modeling, and economic data. This information is provided in Appendix F of the ER (AmerGen 2005).

AmerGen used site-specific meteorological data processed from hourly measurements for the 2003 calendar year as input to the MACCS2 code. The hourly data were collected from the onsite meteorological tower. Small data voids (less than six consecutive hours) were filled using interpolation between data points. Larger data voids were filled using data from the previous hours or days. Data from 2000 and 2001 were also considered, but 2003 data were found to be the most complete and resulted in the highest population dose risk and offsite economic cost risk. Data for 2003 were subsequently used in base case MACCS2 risk calculations. (Data for 2002 were not readily available because of modifications to the collection system implemented in mid-2002.) The NRC staff considers use of the 2003 meteorological data in the SAMA analysis to be reasonable.

The population distribution the applicant used as input to the MACCS2 analysis was estimated for the year 2029, using SECPOP2000 (NRC 2003), U.S. Census block-group level population data (USCB 2000), and population growth rate estimates. The 1990 and 2000 census data were used to estimate an annual average population growth rate for each of the 50-mi-radius rings. The annual growth rate estimate for each ring was applied uniformly to all sectors in the respective ring. The NRC staff considers the methods and assumptions for estimating population reasonable and acceptable for purposes of the SAMA evaluation.

The emergency evacuation model was modeled as a single evacuation zone extending out 10 mi from the plant. It was assumed that 95 percent of the population would move at an average speed of approximately 1.3 mph, with a delayed start time of 30 minutes after a General Emergency has been declared (AmerGen 2005). This assumption is conservative relative to the NUREG-1150 study (NRC 1990) that assumed evacuation of 99.5 percent of the population within the emergency planning zone. The evacuation assumptions and analysis are deemed reasonable and acceptable for the purposes of the SAMA evaluation.

Much of the site-specific economic data were provided from SECPOP2000 (NRC 2003) by specifying the data for each of the counties surrounding the plant, to a distance of 50 mi.

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Generic economic data were revised from the MACCS2 sample problem when better information was available (e.g., per diem living expenses, relocation costs, and value of farm and nonfarm wealth). These values were updated to the year 2000 by using the Consumer Price Index ratio.

The NRC staff concludes that the methodology AmerGen used to estimate the offsite consequences for OCNGS provides an acceptable basis from which to proceed with an assessment of risk reduction potential for candidate SAMAs. Accordingly, the staff based its assessment of offsite risk on the CDF and offsite doses reported by AmerGen.

G.3 Potential Plant Improvements

The process for identifying potential plant improvements, an evaluation of that process, and the improvements evaluated in detail by AmerGen are discussed in this section.

G.3.1 Process for Identifying Potential Plant Improvements

AmerGen's process for identifying potential plant improvements (SAMAs) consisted of the following elements:

- Review of the most significant basic events from the OCNGS 2004B Level 1 and 2 PRA,
- Review of Phase II SAMAs from license renewal applications for five other U.S. nuclear sites,
- Review of potential plant improvements identified in the OCNGS IPE and IPEEE,
- Review of dominant fire areas and SAMAs that could potentially reduce the associated fire risk, and
- Input from OCNGS system managers during the PRA update process and the development of the SAMA list.

On the basis of this process, an initial set of 136 candidate SAMAs was identified. (The ER states that 138 SAMAs were identified; however, two were listed as Not Used.) In Phase I of the evaluation, AmerGen performed a qualitative screening of the initial list of SAMAs and eliminated SAMAs from further consideration using the following criteria:

- The SAMA is not applicable at OCNGS because of design differences;
- The SAMA requires extensive changes that would involve implementation costs known to exceed any possible benefit (a screening value of \$4.46 million, which represents the

dollar value associated with completely eliminating all internal and external event severe accident risk at OCNGS, was used to support this determination);

- The SAMA has already been implemented at OCNGS;
- The implementation cost obviously exceeds the benefit, or the benefit is negligible; or
- The SAMA has been addressed by a similar SAMA.

Based on this screening, 99 SAMAs were eliminated, leaving 37 for further evaluation. The remaining SAMAs are listed in Table F-16 of the ER (AmerGen 2005). A detailed evaluation was performed for each of the 37 remaining SAMA candidates, as described in Sections G.4 and G.6 below. To account for the potential impact of external events, the estimated benefits based on internal events were multiplied by a factor of 2 (except for those SAMAs specific to external events, since those SAMAs would not have a corresponding benefit on the risk from internal events).

G.3.2 Review of AmerGen's Process

AmerGen's efforts to identify potential SAMAs focused primarily on areas associated with internal initiating events, but also included explicit consideration of potential SAMAs for seismic, fire, and high wind events. The initial list of SAMAs generally addressed the accident sequences considered to be important to CDF from functional, initiating event, and risk reduction worth (RRW) perspectives at OCNGS, and included selected SAMAs from other plants.

AmerGen provided a tabular listing of the PRA basic events sorted according to their RRW (AmerGen 2005). SAMAs impacting these basic events would have the greatest potential for reducing risk. AmerGen used a RRW cutoff of 1.01, which approximately corresponds to a 1 percent change in CDF given 100 percent reliability of the event. This equates to an averted cost risk (benefit) of approximately \$45,000 (after the benefits are doubled to account for external events). AmerGen also provided and reviewed the LERF-based RRW events down to an RRW of 1.01. AmerGen correlated the top Level 1 and 2 events with the SAMAs evaluated in the ER and showed that all of the significant basic events are addressed by one or more SAMAs (AmerGen 2005). Based on this information, the NRC staff concludes that the set of SAMAs evaluated in the ER addresses the major contributors to CDF and offsite dose.

Although the IPE did not identify any vulnerabilities, 15 modifications to the plant, procedures, and training were identified that had either been implemented, were to be implemented, or were being considered at the time of the completion of the IPE process. Eight of the improvements have not been completed and were included as candidate SAMAs in the current evaluation.

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AmerGen identified OCNGS-specific candidate SAMAs for external events by using the OCNGS IPEEE (as well as the recently completed FPRA.) A total of 14 SAMAs were identified to address external events and were included as candidate SAMAs in the Phase I analysis. These included 11 seismic-related SAMAs and 3 fire-related SAMAs. In addition, two SAMAs related to high wind events were identified and included based on input from OCNGS system managers. Of these SAMAs, five were retained for more detailed evaluation in the Phase II analysis, specifically, two seismic-related SAMAs (67 and 124), one fire-related SAMA (125), and two high-wind-related SAMAs (130 and 134).

The NRC staff notes that the set of SAMAs submitted is not all inclusive, since additional, possibly even less expensive, design alternatives can always be postulated. However, the staff concludes that the benefits of any additional modifications are unlikely to exceed the benefits of the modifications evaluated and that the alternative improvements would not likely cost less than the least expensive alternatives evaluated, when the subsidiary costs associated with maintenance, procedures, and training are considered.

The NRC staff concludes that AmerGen used a systematic and comprehensive process for identifying potential plant improvements for OCNGS, and that the set of potential plant improvements identified by AmerGen is reasonably comprehensive and therefore acceptable. This search included reviewing insights from the plant-specific risk studies, reviewing plant improvements considered in previous SAMA analyses, and using the knowledge and experience of its PRA personnel.

G.4 Risk Reduction Potential of Plant Improvements

AmerGen evaluated the risk reduction potential of the 37 remaining SAMAs that were applicable to OCNGS. The changes made to the model to quantify the impact of the SAMAs are detailed in Section F.6 of Appendix F to the ER (AmerGen 2005). The SAMA evaluations were performed by using realistic assumptions with some conservatism.

AmerGen used model requantification to determine the potential benefits. The CDF and population dose reductions were estimated by using the 2004B model version of the OCNGS PRA. Table G-6 lists the assumptions considered to estimate the risk reduction for each of the evaluated SAMAs, the estimated risk reduction in terms of percent reduction in CDF and population dose, and the estimated total benefit (present value) of the averted risk. The estimated benefits reported in Table G-6 reflect the combined benefit in both internal and external events. The determination of the benefits for the various SAMAs is further discussed in Section G.6.

Table G-6. SAMA Cost-Benefit Screening Analysis for OCNCS

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
7. Enhance alternate injection reliability. Provide hard pipe cross-connection between emergency service water (ESW) and core spray.	Failure probability of 1×10^{-2} assigned to represent operator action and additional equipment operation that could prevent the modification from functioning.	3	4	174,000	240,000	500,000
10. Install alternate path to the torus hard pipe vent via the wet well using a rupture disk.	Operator actions and AC and DC power associated with venting removed from model.	16	19	788,000	1,088,000	1,000,000
18. Improve ability to cool residual heat removal (RHR) heat exchangers through procedure and hardware modifications to allow manual alignment of the fire protection system.	Change model logic such that failure of service water AND failure of fire water, in addition to ESW pumps required for failure of containment spray heat exchangers.	0.5	0.3	8,000	10,000	265,000
20. Reopen main steam isolation valves (MSIVs) to restore main condenser as a heat sink.	Operator error of 0.1 assumed for reopening of spuriously closed steam line.	0.4	0.3	4,000	6,000	400,000
23. Enable manual bypass of explosive valves via installation of a bypass line and manual valve.	Operator error of 0.01 assumed for use of new bypass valve.	0.7	1	42,000	58,000	150,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
25. Install bypass switch to enable quick bypassing of low-pressure permissive for core spray.	Operator error of 0.01 assumed for operator action to bypass the permissive.	0.3	0.3	4,000	6,000	50,000
67. Strengthen seismic capability of the condensate storage tank (CST).	Factor of 5 reduction in CST seismic failure contribution to seismic core damage frequency (CDF).	251	251	139,000	190,000	1,000,000
84. Enable manual operation of all containment vent valves via local controls.	Operator error of 0.01 assumed as alternate if support systems fail.	2	2	80,000	110,000	150,000
88. Modify procedure(s) to specify a control band for containment venting.	Reduction by factor of 10 in operator error for failure to control venting.	0.1	0	0	0	50,000
89. Improve procedure(s) for aligning shutdown cooling (SDC) given high dry well pressure	Operator error requantified considering time available to align SDC increased from 3 hours to 19 hours.	~0	~0	0	0	50,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
91. Modify procedures and training to allow operators to cross-tie emergency AC Buses 1C and 1D under emergency conditions that require operation of critical equipment.	Added gates for divisions of core spray and containment spray that are potentially available with the new cross-tie. Operator error of 0.1 assumed for action to align the new cross-tie.	3	3	118,000	162,000	90,000
92. Modify procedure to eliminate flow restriction and maximize control rod drive (CRD) flow.	Model revised to allow credit for CRD for all events except loss-of-coolant accident (LOCAs).	2	0.6	36,000	50,000	100,000
94. Modify Emergency Operating Procedures (EOPs) to provide a crew action to align fire protection for reactor pressure vessel (RPV) injection.	Operator errors associated with aligning fire protection system reevaluated considering 5-minute increase to cognitive time window.	0.2	0	0	0	50,000
95. Modify procedure(s) to include a caution that containment spray should not be secured if being utilized for accident mitigation.	No penalty is included in the Probabilistic Risk Assessment (PRA) for associated error of commission, thus no benefit calculated.	~0	~0	0	0	50,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
99. Modify procedures and training to operate the isolation condensers (ICs) with no support systems available.	Factor of 10 reduction in operator error associated with opening IC when DC power is unavailable.	16	16	674,000	928,000	150,000
100. Modify the circuit to allow the combustion turbines (CTs) to also supply the "A" bus directly.	Added gates for divisions of core spray and containment spray that are potentially available with the new connection. Also a revised model for increased feedwater system availability (0.01) and heat removal paths (0.1).	4	4	146,000	204,000	500,000
101. Provide a procedure for determining RPV level using fuel zone level indicators with standby liquid control operating.	Factor of 3 reduction in operator errors associated with lowering level to control power for an anticipated transient without scram (ATWS).	0.2	0	0	0	50,000
102. Revise AWTs EOP to provide RPV level correction based on power.	Factor of 3 reduction in operator errors associated with lowering level to control power for an ATWS.	0.2	0	0	0	50,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
104. Develop loss of circulating water abnormal operating procedure to include guidance to allow condensate and feedwater to be adequately protected.	Added credit for cooling condensate pumps by service water as a backup to circulating water. No operator actions modeled.	3	0.8	44,000	60,000	250,000
106. Revise procedure to provide direction for cooldown following loss of reactor building closed cooling water by reducing RPV pressure.	Assumed a 10% reduction in seal LOCA probability.	0.7	0.6	34,000	46,000	50,000
107. Modify the spill valve air supply to be fitted with air accumulators.	Reduced probability of losing CST inventory on loss of instrument air from 0.1 to 0.001.	0.1	0	0	0	250,000
108. Relocate reference leg instrument penetration closer to top of active fuel and recalibrate.	Reduced operator errors to adequately control water level while using either condensate pumps or fire protection or core spray systems following an ATWS.	~0	~0	0	0	1,000,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
109/125A. Provide portable battery charger capable of supplying 125-V DC buses.	Combined operator error and equipment failure probability of 0.1 in added credit for non-LOCA loss of AC power sequences.	16 ^(b)	16 ^(b)	674,000	930,000	75,000
		54 ^(c)	59 ^(c)	3,390,000	4,680,000	
110. Delete high dry well pressure signal from shutdown cooling isolation.	Same as SAMA 89.	~0	~0	0	0	75,000
111. Provide alternate dry well spray injection source, e.g., emergency service-water cross-tie, service-water cross-tie, diesel fire pump cross-tie.	Credit given for use of fire protection system in case of failure of each set of containment spray pumps.	~0	~0	0	0	500,000
112. Ensure high reliability of the cooling-water intake structure via surveillance and active programs.	Loss of intake structure initiating event frequency reduced by approximately a factor of 5.	0.8	0.3	8,000	10,000	1,000,000
124. Reinforce block wall 53.	Seismic CDF contribution from block wall failure eliminated. Release parameters based on modified Individual Plant Examination of External Events (IPEEE) seismic Class distribution.	15 ^(d)	151 ^(d)	84,000	115,000	150,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
125B. Add a bus cross-tie circuit breaker to Bus 1B2.	Eliminates fire risk of Area OB-FZ-6A based on Fire Probabilistic Risk Assessment (FPRA) results.	15 ^(e)	12 ^(e)	445,000	611,000	100,000
125C. Relocation of relief valve cables, circuitry, and components, as well as other modifications, to ensure one train of core spray remains unaffected by fire.	Eliminated dominant contributors to fire risk remaining after implementation of SAMAs 109/125A and 125B.	29 ^(f)	17 ^(f)	397,000	540,000	750,000
127. Increase operator training on systems and operator actions determined to be important in the PRA.	Not modeled.	Not estimated	Not estimated			50,000
128. Institute a program to reduce IC biofouling.	Reduce biofouling basic events by an order of magnitude.	~0	~0	14,000	20,000	200,000
129. Improve internal flooding procedures.	Reduce all internal flood initiating events except "Fire Protection Spray of Buses 1A, 1B" by a factor of 2.	4	1	56,000	78,000	100,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
130. Increase CT building integrity to withstand higher winds.	Assumed factor of 20 reduction in extreme weather loss of offsite power (LOOP), which also causes failure of CT.	30	34	747,000	1,032,000	600,000
132. Modify procedures to allow switching of the CTs to OCNCS while running.	Probability of spurious trip of running CT assumed to be 0.5.	1	1	46,000	64,000	50,000
133. Increase the hot well makeup capability to allow condensate/feedwater to be beneficial over a wide range of LOCA conditions.	Remove from model failure of feedwater due to insufficient makeup capability.	1	2	72,000	100,000	250,000
134. Increase fire pump building integrity to withstand higher winds.	Assumed factor of 20 reduction in extreme weather LOOP, which also causes failure of fire pump building.	16	19	438,000	606,000	150,000
136. Provide alternate power to condensate transfer pumps.	Add gates for alternate AC power supplies to individual condensate transfer pump models.	0.2	0	0	0	100,000

Table G-6. (contd)

SAMA ^(a)	Assumptions	% Risk Reduction		Total Benefit Using 7% Discount Rate (\$)	Total Benefit Using 3% Discount Rate (\$)	Cost (\$)
		CDF	Population Dose			
138. Protect transformers from explosive failure.	LOOP frequency increased by 1×10^{-2} per year to incorporate impact of postulated transformer explosions.	8 ^(g)	9 ^(g)	446,000	616,000	780,000

(a) SAMAs in bold are potentially cost-beneficial when either a 7 percent or 3 percent real discount rate is used in the NRC staff's analysis.
 (b) Value based on doubling of internal events benefits, as reported in ER Section F.6.23 (AmerGen 2005) for SAMA 109.
 (c) Value based on modified base PRA that incorporates the dominant fire risk contributors from the FPRA update, as reported in ER Section F.6.28 for SAMA 125A.
 (d) Values represent the reduction in seismic risk. Risk from internal and fire events is assumed to be unchanged.
 (e) Value based on updated FPRA results, as described in AmerGen's response to RAI followup questions (AmerGen 2006b).
 (f) Benefit is based on prior implementation of SAMAs 109/125A and 125B.
 (g) Impact of transformer explosion not in current PRA. Risk reduction of SAMA is, therefore, equal to risk increase when it is added to the model.

Appendix G

For those SAMAs that specifically address external events (i.e., SAMAs 67, 124, 125, 130, and 134), the reduction in CDF and population dose were calculated as discussed below.

SAMAs 67 and 124 involve modifying the condensate storage tank and reinforcing a block wall to increase their capability in seismic events. For these SAMAs, a seismic baseline risk (CDF, population dose, and offsite economic cost risk) was developed from the IPEEE Level 1 seismic results, and release parameters based on IPEEE seismic accident class distribution, and release characteristics were estimated based on the current Level 2 model. The contribution to seismic CDF from each of the failures addressed by the SAMAs was then estimated from the IPEEE and used with the seismic baseline risk to estimate the averted cost risk. These SAMAs were assumed to have no additional benefits in internal events.

SAMA 125 was subsequently separated into three specific SAMAs that address fire risk contributors: SAMA 125A involves providing portable battery chargers capable of supplying 125-V DC buses, SAMA 125B involves adding a circuit breaker related to fire area OB-FZ-6A, and SAMA 125C involves rerouting of cable in dominant fire areas. To determine the benefit of these modifications, a new baseline risk was determined by incorporating the two dominant fire areas from the FPRA reanalysis into the internal events PRA. The benefits of the SAMA 125 modifications were then determined by making appropriate changes to this new baseline risk model and reevaluating the risk. The evaluations for each SAMA are discussed below.

- SAMA 125A – This SAMA involves providing a portable battery charger capable of supplying 125-V DC buses in order to preserve isolation condenser and electromagnetic relief valve operability along with adequate instrumentation. The same plant change was identified as SAMA 109, based on internal event considerations. SAMA 109 and 125A represent the same physical modification evaluated by using two different approaches. The first approach is based on a doubling of benefits from the internal events PRA to account for external events, and results in an estimated benefit of \$674,000 based on a 7 percent discount rate. The second approach is based on the use of the modified baseline risk model, which incorporates the two dominant fire areas from the FPRA reanalysis, and results in an estimated benefit of \$3.4 million based on a 7 percent discount rate. The latter value is considered the best value to use for the benefit of SAMAs 109/125A.

The NRC staff notes that SAMA 109 was singled out for reevaluation by using the revised fire model because it was designed to deal with station blackout sequences; these types of sequences dominate both the internal event risk and the fire risk. Other internal event SAMAs were reviewed by AmerGen to identify similar circumstances and found not to be applicable, or to be less beneficial than SAMA 109.

- SAMA 125B – This SAMA involves the installation of an additional circuit breaker on Bus 1B2 in order to reduce a failure mode applicable to fires in the “A” 480-VAC

switchgear room. The estimated benefit for SAMA 125B reported in the ER is based on an assumption that SAMA 109/125A has already been implemented (i.e., the residual risk after implementing SAMA 109/125A was used as the baseline for determining the further benefit of SAMA 125B.) In response to an RAI, AmerGen provided an estimate of the benefits associated with SAMA 125B without credit for prior implementation of SAMA 109/125A (AmerGen 2006b). This estimate was based on the result of the FPRA. The averted cost risk for SAMA 125B (without credit for implementation of SAMA 109/125A) is approximately \$445,000, based on a 7 percent discount rate.

- SAMA 125C – This SAMA involves the relocation of relief valve cables, circuitry, and components to allow credit for depressurization and core spray as a backup to the isolation condenser. In addition, other modifications would be required to ensure that at least one train of core spray remains unaffected by the postulated fire event. The risk after incorporation of SAMAs 109/125A and 125B was used as the baseline to evaluate SAMA 125C. The averted cost risk for SAMA 125C (with credit for prior implementation of SAMAs 109/125A and 125B) is approximately \$397,000 based on a 7 percent discount rate. AmerGen did not provide an estimate for the implementation of SAMA 125C alone on the basis that the costs, competing risks, and expected benefit associated with this SAMA would make it undesirable. In a follow-up RAI response, AmerGen indicated that if SAMA 125B is not implemented for fire area OB-FZ-6A, then SAMA 125C should be considered in place of SAMA 125B (AmerGen 2006b).

SAMAs 130 and 134 involve modifications to the combustion turbine building and fire pump building to address high wind events. For these SAMAs, the internal events model includes the impact of failure of the building due to high winds by taking no credit for these components/structures for those Loss of Offsite Power events that are due to extreme winds. The benefit of strengthening these structures to withstand higher wind speeds was estimated by reducing the probability that extreme winds would fail these structures. Since these SAMAs would not have any impact on risk from other external events, the factor of 2 multiplier for external events was not applied. In response to an NRC RAI, AmerGen discussed the implications of changes in the wind hazard curve suggested by an NRC RAI on the IPEEE, and provided additional benefit estimates based on an alternative wind hazard curve. The NRC staff believes that the original assessment of the benefits of SAMAs 130 and 134, as provided in the ER, are appropriate.

The NRC staff has reviewed AmerGen's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and somewhat conservative (i.e., the estimated risk reduction is similar to or somewhat higher than what would actually be realized). Accordingly, the staff based its estimates of averted risk for the various SAMAs on AmerGen's risk reduction estimates.

G.5 Cost Impacts of Candidate Plant Improvements

AmerGen estimated the costs of implementing the 37 candidate SAMAs through the application of engineering judgment, use of other licensees' estimates for similar improvements, and development of site-specific cost estimates. The cost estimates conservatively did not include the cost of replacement power during extended outages required to implement the modifications, nor did they include contingency costs associated with unforeseen implementation obstacles. The cost estimates provided in the ER did not account for inflation.

The NRC staff reviewed the bases for the applicant's cost estimates. For certain improvements, the staff also compared the cost estimates with estimates developed elsewhere for similar improvements, including estimates developed as part of other licensees' analyses of SAMAs for operating reactors and advanced light-water reactors. The staff reviewed the costs and found them to be consistent with estimates provided in support of other plants' analyses.

The NRC staff concludes that the cost estimates provided by AmerGen are sufficient and appropriate for use in the SAMA evaluation.

G.6 Cost-Benefit Comparison

AmerGen's cost-benefit analysis and the NRC staff's review are described in the following sections.

G.6.1 AmerGen's Evaluation

The methodology used by AmerGen was based primarily on NRC's guidance for performing cost-benefit analysis, that is, NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997b). The guidance involves determining the net value for each SAMA according to the following formula:

$$\text{Net Value} = (\text{APE} + \text{AOC} + \text{AOE} + \text{AOSC}) - \text{COE}$$

where,

- APE = present value of averted public exposure (\$),
- AOC = present value of averted offsite property damage costs (\$),
- AOE = present value of averted occupational exposure costs (\$),
- AOSC = present value of averted onsite costs (\$), and
- COE = cost of enhancement (\$).

If the net value of a SAMA is negative, the cost of implementing the SAMA is larger than the benefit associated with the SAMA and it is not considered cost-beneficial. AmerGen's derivation of each of the associated costs is summarized below.

NUREG/BR-0058 has recently been revised to reflect the agency's policy on discount rates. Revision 4 of NUREG/BR-0058 states that two sets of estimates should be developed: one at 3 percent and one at 7 percent (NRC 2004b). AmerGen provided both sets of estimates (AmerGen 2005).

Averted Public Exposure (APE) Costs

The APE costs were calculated by using the following formula:

$$\begin{aligned} \text{APE} = & \text{Annual reduction in public exposure } (\Delta \text{ person-rem/year}) \\ & \times \text{monetary equivalent of unit dose } (\$2000 \text{ per person-rem}) \\ & \times \text{present value conversion factor } (10.76 \text{ based on a 20-year period with a} \\ & \quad \text{7 percent discount rate}). \end{aligned}$$

As stated in NUREG/BR-0184 (NRC 1997b), it is important to note that the monetary value of the public health risk after discounting does not represent the expected reduction in public health risk due to a single accident. Rather, it is the present value of a stream of potential losses extending over the remaining lifetime (in this case, the renewal period) of the facility. Thus, it reflects the expected annual loss due to a single accident, the possibility that such an accident could occur at any time over the renewal period, and the effect of discounting these potential future losses to present value. For the purposes of initial screening, which assumes elimination of all severe accidents due to internal events, AmerGen calculated an APE of approximately \$775,000 for the 20-year license renewal period.

Averted Offsite Property Damage Costs (AOC)

The AOCs were calculated by using the following formula:

$$\begin{aligned} \text{AOC} = & \text{Annual CDF reduction} \\ & \times \text{offsite economic costs associated with a severe accident (on a per-event} \\ & \quad \text{basis)} \\ & \times \text{present value conversion factor.} \end{aligned}$$

For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, AmerGen calculated an annual offsite economic risk of about \$118,000 based on the Level 3 risk analysis. This results in a discounted value of approximately \$1,270,000 for the 20-year license renewal period.

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Averted Occupational Exposure (AOE) Costs

The AOE costs were calculated by using the following formula:

$$\begin{aligned} \text{AOE} = & \text{Annual CDF reduction} \\ & \times \text{occupational exposure per core damage event} \\ & \times \text{monetary equivalent of unit dose} \\ & \times \text{present value conversion factor.} \end{aligned}$$

AmerGen derived the values for averted occupational exposure from information provided in Section 5.7.3 of the regulatory analysis handbook (NRC 1997b). Best estimate values provided for immediate occupational dose (3300 person-rem) and long-term occupational dose (20,000 person-rem over a 10-year cleanup period) were used. The present value of these doses was calculated by using the equations provided in the handbook in conjunction with a monetary equivalent of unit dose of \$2000 per person-rem, a real discount rate of 7 percent, and a time period of 20 years to represent the license renewal period. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, AmerGen calculated an AOE of approximately \$4000 for the 20-year license renewal period.

Averted Onsite Costs (AOSC)

The AOSC include averted cleanup and decontamination costs and averted power replacement costs. Repair and refurbishment costs are considered for recoverable accidents only and not for severe accidents. AmerGen derived the values for AOSC based on information provided in Section 5.7.6 of the regulatory analysis handbook (NRC 1997b).

AmerGen divided this cost element into two parts: the Onsite Cleanup and Decontamination Cost, also commonly referred to as averted cleanup and decontamination costs, and the Replacement Power Cost.

Averted cleanup and decontamination costs (ACC) were calculated by using the following formula:

$$\begin{aligned} \text{ACC} = & \text{Annual CDF reduction} \\ & \times \text{present value of cleanup costs per core damage event} \\ & \times \text{present value conversion factor.} \end{aligned}$$

The total cost of cleanup and decontamination subsequent to a severe accident is estimated in the regulatory analysis handbook to be $\$1.1 \times 10^9$ (discounted). This value was converted to present costs over a 10-year cleanup period and integrated over the term of the proposed license extension. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, AmerGen calculated an ACC of approximately \$124,000 for the 20-year license renewal period.

Long-term replacement power costs (RPC) were calculated using the following formula:

$$\begin{aligned} \text{RPC} = & \text{Annual CDF reduction} \\ & \times \text{ present value of replacement power for a single event} \\ & \times \text{ factor to account for remaining service years for which replacement power is} \\ & \quad \text{required} \\ & \times \text{ reactor power scaling factor} \end{aligned}$$

AmerGen based its calculations on the value of 630 megawatts electric (MW(e)). Therefore, AmerGen applied power scaling factors of 630 MWe/910 MWe to determine the replacement power costs. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, AmerGen calculated the AOSC to be approximately \$182,000.

By using the above equations, AmerGen estimated the total present dollar value equivalent associated with completely eliminating severe accidents due to internal events at OCNCS to be about \$2,231,000. To account for additional risk reduction in external events, AmerGen doubled this value (to \$4,462,000) to provide the modified maximum averted cost risk (MMACR), which represents the dollar value associated with completely eliminating all internal and external event severe accident risk at OCNCS.

AmerGen's Results

If the implementation costs for a candidate SAMA were greater than the MMACR of \$4,462,000, then the SAMA was screened from further consideration. A more refined look at the costs and benefits was performed for the remaining SAMAs. If the implementation costs for a candidate SAMA exceeded the calculated benefit, the SAMA was considered not to be cost-beneficial. In the baseline analysis contained in the ER (using a 7 percent discount rate), AmerGen identified seven potentially cost-beneficial SAMAs. On the basis of an analysis using a 3 percent real discount rate, as recommended in NUREG/BR-0058 (NRC 2004b), two additional SAMA candidates were determined to be potentially cost-beneficial. The potentially cost-beneficial SAMAs are:

- SAMA 10 – install alternate path to the torus hard pipe vent via the wet well using a rupture disk (cost-beneficial at 3 percent discount rate),
- SAMA 91 – modify procedures and training to allow operators to cross-tie emergency AC Buses 1C and 1D under emergency conditions that require operation of critical equipment,
- SAMA 99 – modify procedures and training to operate the isolation condensers with no support systems available,

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- SAMA 109/125A – provide portable DC battery charger capable of supplying 125-V buses in order to preserve isolation condenser and electromagnetic relief valve operability along with adequate instrumentation,
- SAMA 125B – add a bus cross-tie circuit breaker to Bus 1B2 to reduce the impact of fires in the 480-V AC switchgear room,
- SAMA 127 – increase operator training on the systems and operator actions determined to be important from the PRA,
- SAMA 130 – increase combustion turbine building integrity to withstand higher winds so that combustion turbines would be capable of withstanding a severe weather event,
- SAMA 132 – modify procedures to allow switching of the combustion turbines to OCNCS while running (cost-beneficial at 3 percent discount rate), and
- SAMA 134 – increase fire pump house building integrity to withstand higher winds so that the fire system would be capable of withstanding a severe weather event.

AmerGen performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment (AmerGen 2005). If the benefits are increased by a factor of 2.5 to account for uncertainties, six additional SAMA candidates (beyond those identified in the 3 percent discount rate case) were determined to be potentially cost-beneficial (SAMAs 84, 106, 124, 125C, 129, and 138). The potentially cost-beneficial SAMAs are discussed in more detail in Section G.6.2.

G.6.2 Review of AmerGen's Cost-Benefit Evaluation

The cost-benefit analysis performed by AmerGen was based primarily on NUREG/BR-0184 (NRC 1997b) and was executed consistent with this guidance.

To account for external events, AmerGen multiplied the internal event benefits by a factor of 2 for each SAMA, except those SAMAs that specifically address external events (i.e., SAMAs 67, 124, 125, 130, and 134). Doubling the benefit for these SAMAs is not appropriate since these SAMAs are specific to external events and would not have a corresponding benefit in risk from internal events. Given that the CDF from internal fires and other external events as reported by AmerGen is less than the CDF for internal events, the NRC staff agrees that the factor of 2 multiplier for external events is reasonable.

AmerGen considered the impact that possible increases in benefits from analysis uncertainties would have on the results of the SAMA assessment. Currently, an uncertainty distribution is not available for the SAMA PRA model. Therefore, AmerGen reviewed the point estimate and

95th percentile CDFs for several SAMA submittals. The factor by which the 95th percentile CDFs are greater than the point estimate CDFs ranged from 2.35 to 2.45 (AmerGen 2005). AmerGen reexamined the initial set of SAMAs to determine if any additional Phase I SAMAs would be retained for further analysis if the benefits were increased by a factor of 2.5. No additional Phase I SAMAs were identified. AmerGen also considered the impact on the Phase II screening if the benefits were increased by a factor of 2.5 (in addition to the factor of 2 multiplier already included in the baseline benefit estimates to account for external events). Six additional SAMAs (beyond the nine SAMAs identified above) could be cost-beneficial. These additional SAMAs are SAMAs 84, 106, 124, 125C, 129, and 138.

AmerGen recognized that a combination of lower-cost SAMAs can provide much of the risk reduction associated with higher-cost SAMAs, and may act synergistically to yield a combined risk reduction greater than the sum of the benefits for each SAMA if implemented individually. AmerGen assessed various combinations of the seven potentially cost-beneficial SAMAs identified in the baseline case. Based on this, AmerGen identified a subset of four SAMAs along with a priority for implementation based on individual maximum net values. In order of implementation priority, they are:

- SAMA 109/125A – provide portable DC battery charger capable of supplying 125-V buses in order to preserve isolation condenser and electromagnetic relief valve operability along with adequate instrumentation,
- SAMA 134 – increase fire pump house building integrity to withstand higher winds so that the fire system would be capable of withstanding a severe weather event,
- SAMA 125B – add a bus cross-tie circuit breaker to Bus 1B2 to reduce the impact of fires in the 480-V AC switchgear room, and
- SAMA 127 – increase operator training on the systems and operator actions determined to be important from the PRA.

AmerGen concluded that if the above SAMAs are implemented, then the remaining SAMAs identified as cost-beneficial in the baseline analysis (i.e., SAMAs 91, 99, and 130) will no longer be cost-beneficial (AmerGen 2005).

The NRC staff noted that several SAMAs, which are only cost-beneficial at the upper bound (95th percentile), do not appear to have competing effects and may remain cost-beneficial (at the upper bound) even after implementing the four aforementioned SAMAs. Therefore, the staff asked AmerGen to provide an assessment of the upper bound net values for these SAMAs (i.e., SAMAs 10, 84, 106, 124, 125C, 129, 132, and 138), assuming that the four cost-beneficial SAMAs noted above are implemented (NRC 2005). In its response, AmerGen provided the upper bound net values for these SAMAs (AmerGen 2006a). With the exception of SAMAs 84

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and 138, these SAMAs remained individually cost-beneficial at the upper bound. Two of these SAMAs (10 and 125C) have large implementation costs (approximately \$1 million); however, the upper bound net values are also large (approximately \$200,000 to \$800,000). The other four SAMAs (99, 129, 132, and 124) have lower implementation costs (\$50,000 to \$150,000), but also have lower net values (\$60,000 to \$90,000).

The NRC staff concludes that, with the exception of the potentially cost-beneficial SAMAs discussed above, the costs of the SAMAs evaluated would be higher than the associated benefits.

G.7 Conclusions

AmerGen compiled a list of 136 SAMAs based on a review of the most significant basic events from the plant-specific PRA, Phase II SAMAs from license renewal activities for other plants, insights from the plant-specific IPE and IPEEE, review of dominant fire areas, and input from OCNCS systems managers. A qualitative screening removed SAMA candidates that (1) were not applicable at OCNCS because of design differences, (2) required extensive changes that would involve implementation costs known to exceed any possible benefit (i.e., more than \$4.46 million), (3) had already been implemented at OCNCS, (4) had a negligible benefit, or (5) had been addressed by a similar SAMA. Ninety-nine SAMAs were eliminated, leaving 37 for further evaluation.

For the remaining SAMA candidates, a more detailed design and cost estimates were developed as shown in Table G-6. The cost-benefit analyses showed that seven of the SAMA candidates were potentially cost-beneficial in the baseline analysis. AmerGen performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment. As a result, seven additional SAMAs were identified as potentially cost-beneficial. AmerGen evaluated the impact of implementing four potentially cost-beneficial SAMAs. The evaluation indicated that the remaining three SAMAs that were determined to be cost-beneficial in the baseline analysis would no longer be cost-beneficial. However, several SAMAs would remain potentially cost-beneficial when evaluated at the upper bound.

The NRC staff reviewed the AmerGen analysis and concluded that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs support the general conclusion that the SAMA evaluations performed by AmerGen are reasonable and sufficient for the license renewal submittal. Although the treatment of SAMAs for external events was somewhat limited by the unavailability of an external events PRA, the likelihood of there being cost-beneficial enhancements in this area was minimized by inclusion of several candidate SAMAs related to external events, insights from the FPRA, and inclusion of a multiplier to account for external events.

The NRC staff concurs with AmerGen's identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of all or a subset of the identified, potentially cost-beneficial SAMAs. Given the potential for cost-beneficial risk reduction, the staff concludes that further evaluation of these SAMAs by AmerGen is warranted. However, none of these SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

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11. ABSTRACT (200 words or less)

This final supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the Nuclear Regulatory Commission (NRC) by AmerGen Energy Company, LLC (AmerGen) to renew the operating license for the Oyster Creek Nuclear Generating Station (Oyster Creek) for an additional 20 years under 10 CFR Part 54. This final SEIS includes the NRC staff's analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts.

The NRC staff's recommendation is that the Commission determine that the adverse environmental impacts of license renewal for Oyster Creek are not so great that preserving the option of license renewal for energy-planning decision makers would be unreasonable. This recommendation is based on the following: (1) the analysis and findings in the Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437); (2) the Environmental Report submitted by AmerGen; (3) consultation with other Federal, State, Tribal, and Local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments.

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